

김현승 (한국학중앙연구원 디지털인문학연구소)

Protege™



1

프로테제 다운로드 및 실행

1987

언제(when)

Stanford
University

University
of
Manchester

누가(who)

ontology
editor

knowledge
acquisition
system

무엇을(what)

free,
open
source

어떻게(how)

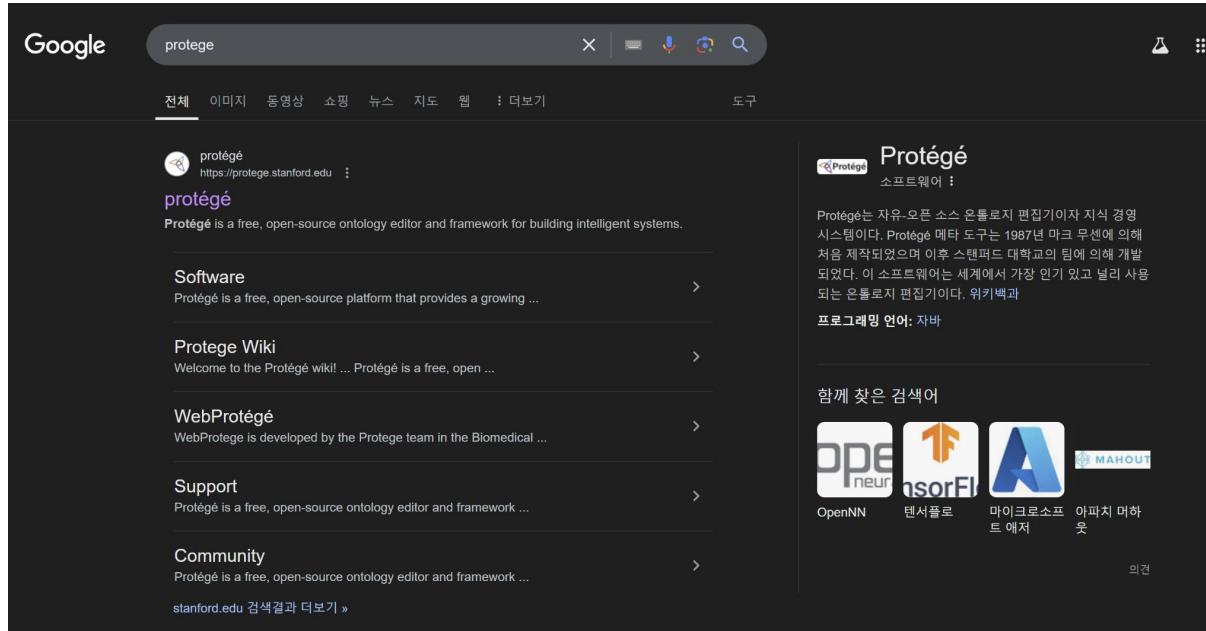
<http://protegewiki.stanford.edu/>

어디에서(where)



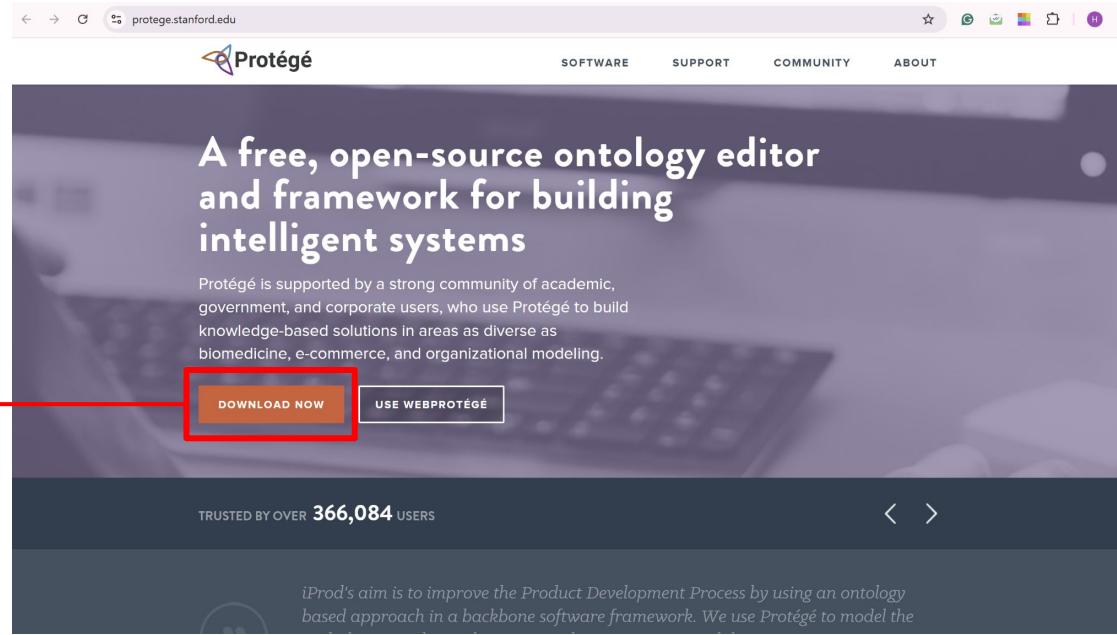
프로테제 다운로드

- ❖ 인터넷 검색창에서 protege 검색 → 홈페이지 클릭



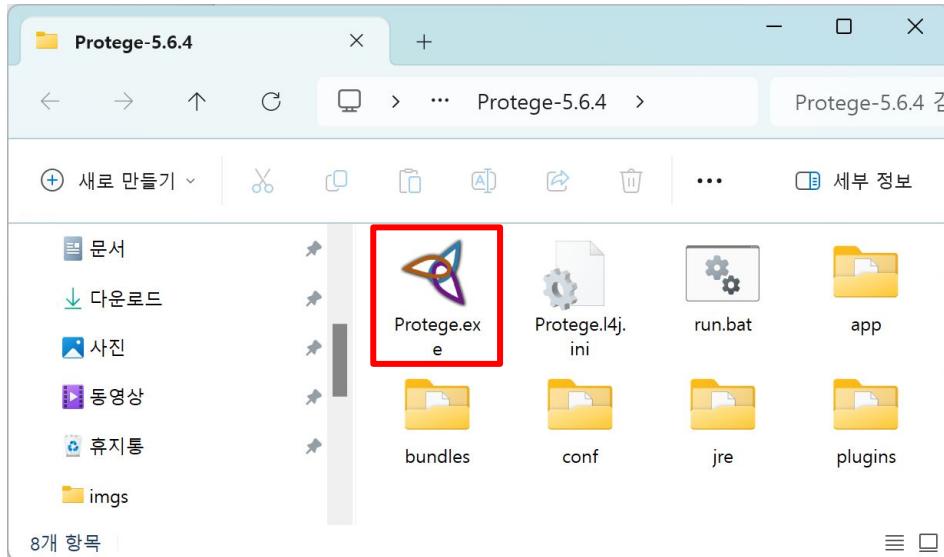
프로테제 다운로드

- ❖ DOWNLOAD NOW 버튼 클릭 → 파일 설치 및 실행



프로테제 다운로드

- ❖ 다음에 작업할 때에는 Protege 폴더에 있는 Protege.exe 파일을 실행하여 사용하면 된다.

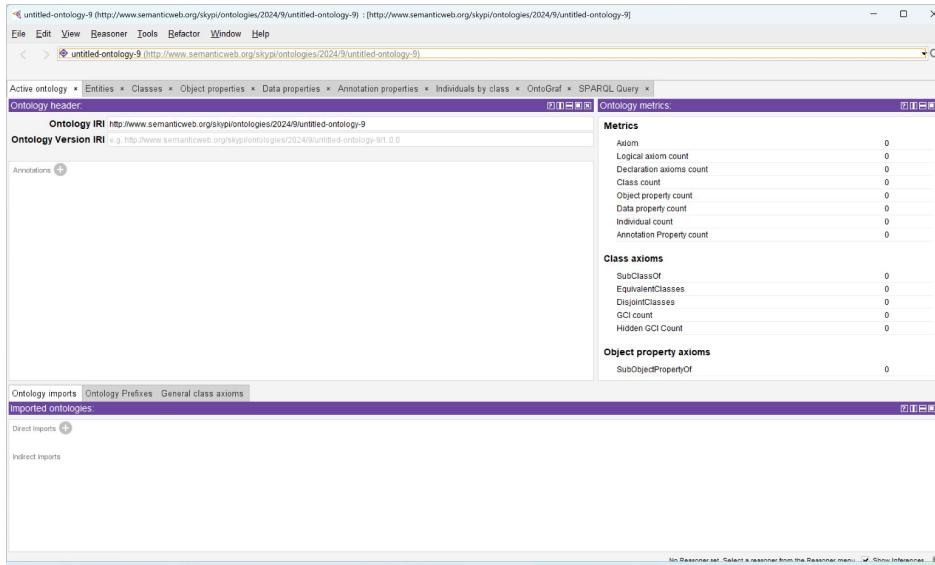


2

프로테제 화면 구성

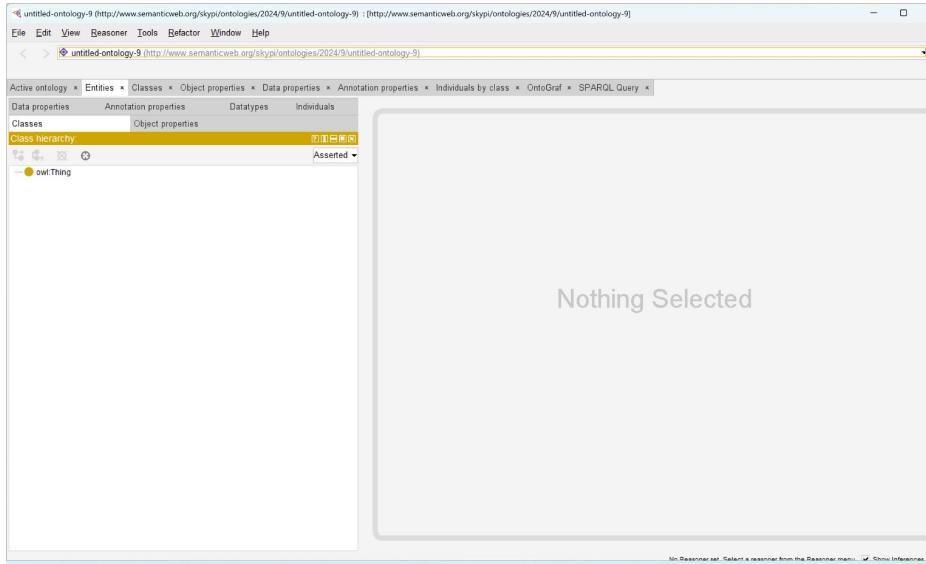
Active Ontology : 온톨로지 개발

- ❖ 처음엔 Active Ontology 화면이 나타난다.
- ❖ 온톨로지에 대한 기본적인 설명을 작성한다.



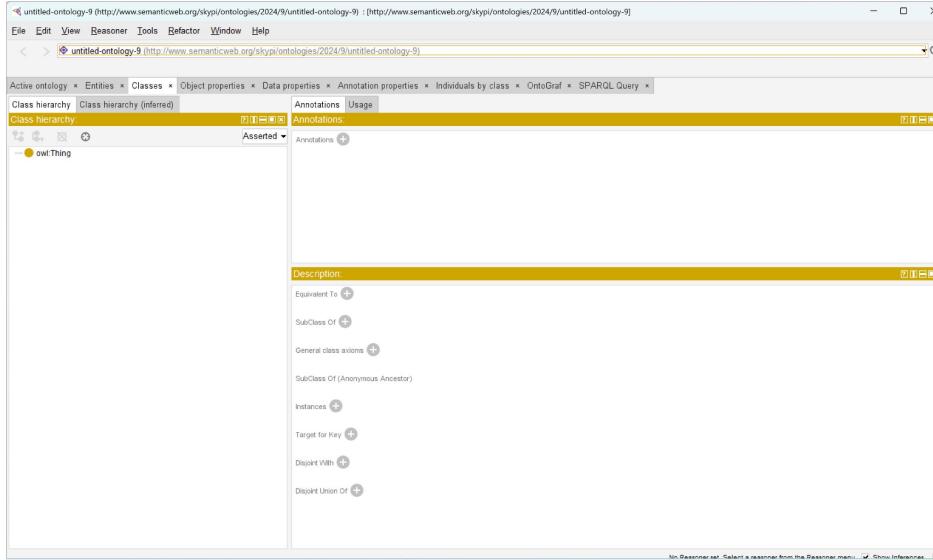
Entities : 통합 작업 환경

- ❖ 엔티티라고 하는 통합 작업 환경 창을 볼 수 있다.
- ❖ Class, Property, Relation 등 통합적으로 작업하는 곳이다.



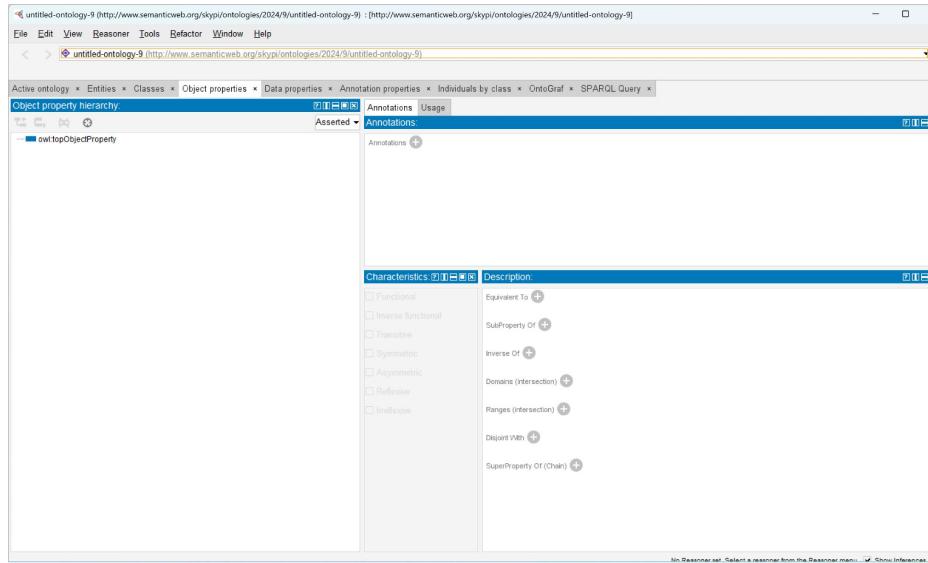
Classes : 클래스 작업 환경

- ❖ 클래스 작업을 할 수 있는 곳이다.
- ❖ 개체들의 범주를 설정해준다.



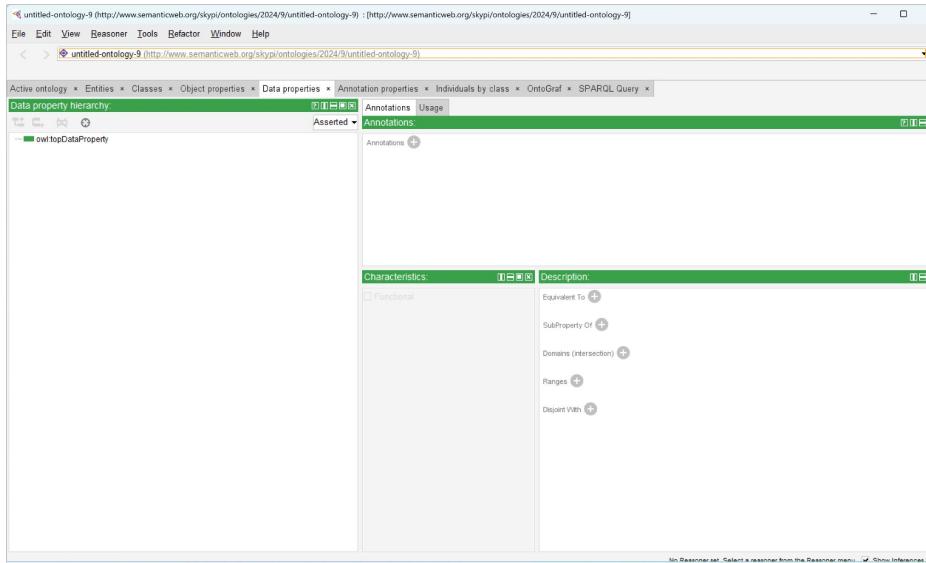
Object properties : 연결정보 작업 환경

- ❖ 오브젝트 프로퍼티 작업을 할 수 있는 곳이다.
- ❖ Domain, Range 등의 관계를 서술한다.



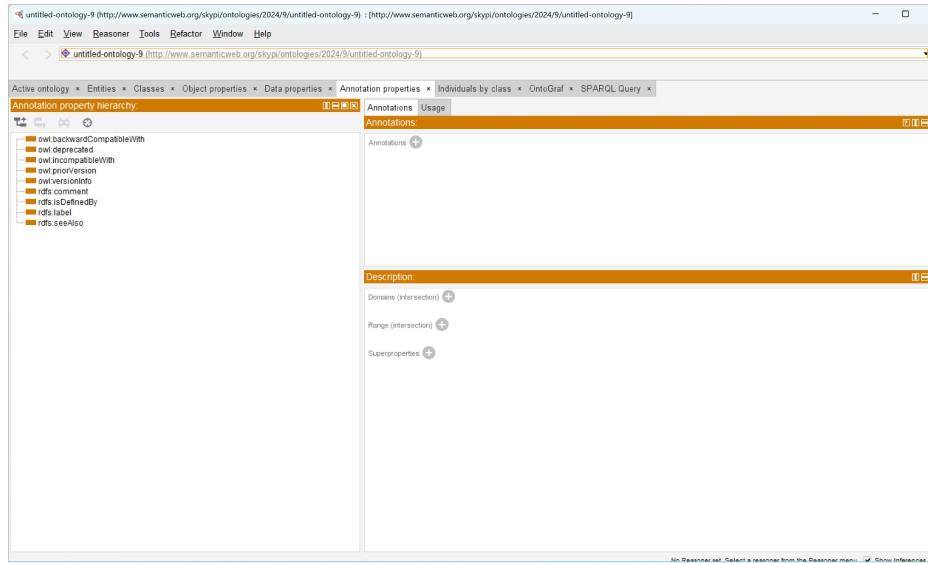
Data properties : 데이터 작업 환경

- ❖ 데이터 프로퍼티 작업을 할 수 있는 곳이다.
- ❖ 개체들의 속성을 설정한다.



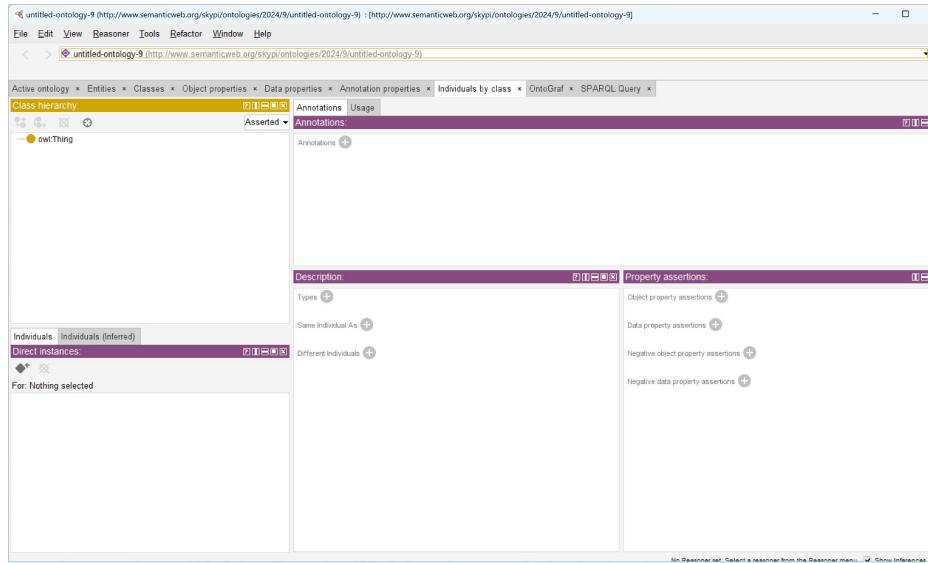
Annotation properties : 설명 정보 작업 환경

- ❖ 주석과 관련한 정보를 관리하는 곳이다.



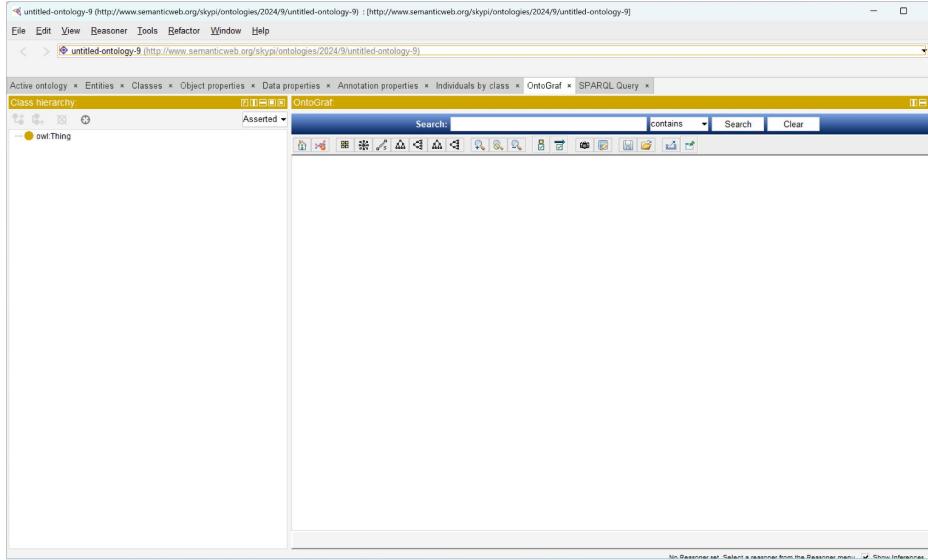
Individuals by class : 개체 작업 환경

- ❖ 정보화 하고자 하는 지식 요소들을 입력한다.



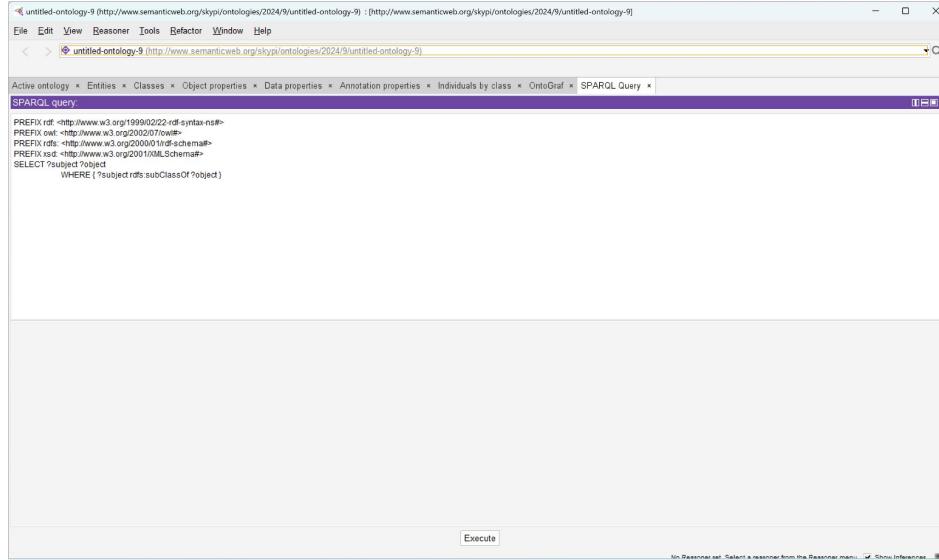
OntoGraf : 시각화

- ❖ 온톨로지 설계 내용을 시각적인 화면으로 확인할 수 있다.
- ❖ 그래프 모양을 캡쳐해서 논문에 사용하기도 한다.



SPARQL Query : 온톨로지를 위한 질문 방식

- ❖ SPARQL(Simple Protocol and RDF Query Language) : RDF (Resource Description Framework) 형식의 데이터를 탐색할 수 있는 데이터베이스 질의어.



The screenshot shows the OntoGraf application window. At the top, there's a menu bar with File, Edit, View, Reasoner, Tools, Refactor, Window, and Help. Below the menu is a toolbar with icons for back, forward, search, and other functions. The main area has tabs for Active ontology, Entities, Classes, Object properties, Data properties, Annotation properties, Individuals by class, OntoGraf, and SPARQL Query. The SPARQL Query tab is active, showing the following query:

```
PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>
PREFIX owl: <http://www.w3.org/2002/07/owl#>
PREFIX rdfs: <http://www.w3.org/2000/01/rdf-schema#>
PREFIX xsd: <http://www.w3.org/2001/XMLSchema#>
SELECT ?subject ?object
WHERE { ?subject rdfs:subClassOf ?object }
```

At the bottom right of the main area, there is an "Execute" button. A status bar at the bottom indicates "On Reasoner set. Select a reasoner from the Reasoner menu..." and "Ctrl+Shift+F5".

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프로테제 실습 - Active Ontology

Active Ontology : IRI 입력

The screenshot shows the Semantic Web interface for managing ontologies. At the top, the title bar indicates the ontology is titled "untitled-ontology-9" and its version is "0.0". The menu bar includes File, Edit, View, Reasoner, Tools, Befactor, Window, and Help. Below the menu is a toolbar with various icons. The main window has tabs for Active ontology, Entities, Classes, Object properties, Data properties, Annotation properties, Individuals by class, OntoGraf, and SPARQL Query. The "Ontology header" section displays the ontology's IRI (<http://www.semanticweb.org/skypis/ontologies/2024/9/untitled-ontology-9>) and version IRI (<http://www.semanticweb.org/skypis/ontologies/2024/9/untitled-ontology-9/1.0>). A red box highlights the "Ontology IRI" field. To the right, the "Metrics" panel lists various counts: Axiom (0), Logical axiom count (0), Declaration axioms count (0), Class count (0), Object property count (0), Data property count (0), Individual count (0), and Annotation Property count (0). Below the metrics is the "Class axioms" section, which currently shows 0 SubClassOf relationships. A blue box highlights the "▼ 권장하는 IRI 주소" (Recommended IRI address) and the URL <http://dh.aks.ac.kr/ontologies/khs>. A yellow box highlights the "본인 이름" (Own name) text. At the bottom, the status bar shows "No Reasoner set. Select a reasoner from the Reasoner menu." and "Show Inferences".

IRI : 온톨로지 주소

▼ 권장하는 IRI 주소

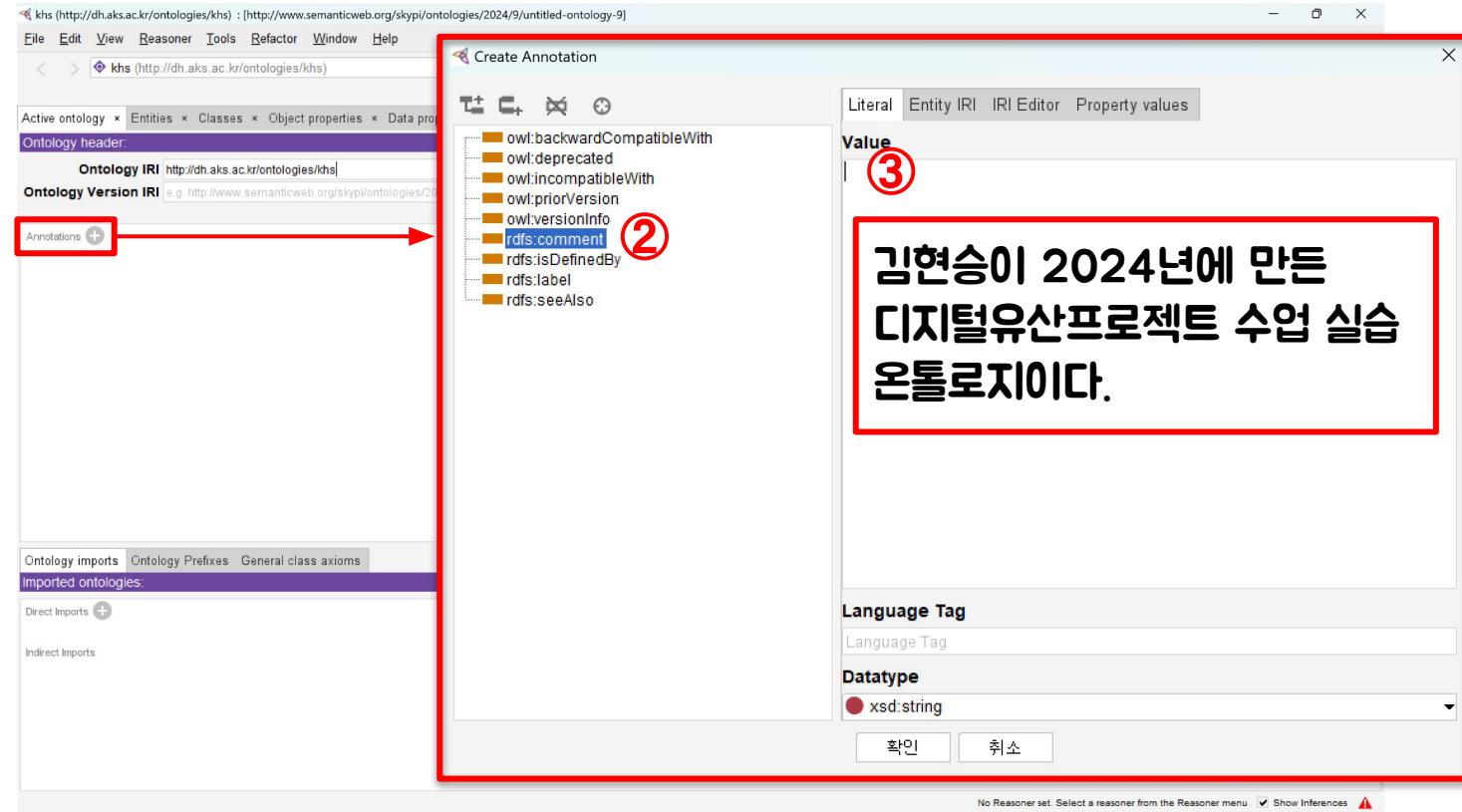
<http://dh.aks.ac.kr/ontologies/khs>

본인 이름

Active Ontology : 수정된 IRI 확인

The screenshot shows the OntoGraf interface for managing ontologies. The title bar indicates the ontology is named 'khs' at the URL <http://dh.aks.ac.kr/ontologies/khs>. The main window displays the ontology header, which includes the Ontology IRI (<http://dh.aks.ac.kr/ontologies/khs>) and the Ontology Version IRI (<http://www.semanticweb.org/skypy/ontologies/2024/9/untitled-ontology-9/1.0.0>). The interface features several tabs: Active ontology, Entities, Classes, Object properties, Data properties, Annotation properties, Individuals by class, OntoGraf, and SPARQL Query. On the right side, there are sections for 'Metrics' (Axiom, Logical axiom count, Declaration axioms count, Class count, Object property count, Data property count, Individual count, Annotation Property count) and 'Class axioms' (SubClassOf, EquivalentClasses, DisjointClasses, GCI count, Hidden GCI Count). Below these are sections for 'Object property axioms' (SubObjectPropertyOf) and 'Imported ontologies'. A status bar at the bottom notes 'No Reasoner set. Select a reasoner from the Reasoner menu' and 'Show Inferences'.

Active Ontology : Annotations 입력



Active Ontology : Annotations 입력

The screenshot shows the Active Ontology software interface. On the left, the main ontology editor displays the 'Ontology header' section with 'Ontology IRI' set to <http://dh.aks.ac.kr/ontologies/khs>. Below it, there's a list of imports and prefixes. A red box highlights the 'Language Tag' dropdown in the 'Value' tab of the annotation dialog.

Create Annotation

Value
김현승이 2024년에 만든 디지털유산프로젝트 수업 실습 온톨로지이다.

Language Tag

- ko|
- kg (Kongo)
- ko (Korean)
- kv (Komi)
- zh-HK (Chinese; Hong Kong)

④

⑤ 확인

No Reasoner set. Select a reasoner from the Reasoner menu. Show Inferences

Active Ontology : Annotations 입력

The screenshot shows the OntoGraf interface for managing an ontology. The main window title is "khs (http://dh.aks.ac.kr/ontologies/khs) : [http://www.semanticweb.org/skyp1/ontologies/2024/9/untitled-ontology-9]". The menu bar includes File, Edit, View, Reasoner, Tools, Refactor, Window, and Help. The toolbar has icons for back, forward, search, and other functions.

The top navigation bar includes Active ontology, Entities, Classes, Object properties, Data properties, Annotation properties, Individuals by class, OntoGraf, and SPARQL Query.

The left sidebar shows the Ontology header with IRI <http://dh.aks.ac.kr/ontologies/khs> and Version IRI <http://www.semanticweb.org/skyp1/ontologies/2024/9/untitled-ontology-9/1.0.0>.

The central area displays an annotation entry under the Annotations tab. The annotation is:

```
rdftcomment [[language: ko]  
김현승이 2024년에 만든 디지털유산프로젝트 수업 실습 온라인으로 제작되었다.]
```

This entry is highlighted with a red rectangle.

The right side of the interface contains the Ontology metrics section, which provides a summary of the ontology's structure:

Metrics	Count
Axiom	0
Logical axiom count	0
Declaration axioms count	0
Class count	0
Object property count	0
Data property count	0
Individual count	0
Annotation Property count	1

Below the metrics are sections for Class axioms, Object property axioms, and General class axioms, each with a count of 0.

The bottom navigation bar includes tabs for Ontology imports, Ontology Prefixes, and General class axioms. It also lists imported ontologies and provides options for Direct Imports and Indirect Imports.

At the bottom right, there is a message: "No Reasoner set. Select a reasoner from the Reasoner menu" with a checked checkbox, and "Show Inferences" with a warning icon.

Active Ontology : Ontology Prefixes 추가

The screenshot shows the OntoGraf interface for managing an ontology named 'khs'. The top navigation bar includes File, Edit, View, Reasoner, Tools, Refactor, Window, and Help. The main window has tabs for Active ontology, Entities, Classes, Object properties, Data properties, Annotation properties, Individuals by class, OntoGraf, and SPARQL Query. The current tab is Active ontology.

Ontology header:

- Ontology IRI: <http://dh.aks.ac.kr/ontologies/khs>
- Ontology Version IRI: e.g. <http://www.semanticweb.org/skyp1/ontologies/2024/9/untitled-ontology-9/1.0.0>

Annotations:

rdfs:comment [language: ko]
김첨승이 2024년에 만든 디지털유산프로젝트 수업 실습 온보드로지이다.

Metrics

Axiom	0
Logical axiom count	0
Declaration axioms count	0
Class count	0
Object property count	0
Data property count	0
Individual count	0
Annotation Property count	1

Class axioms

SubClassOf	0
EquivalentClasses	0
DisjointClasses	0
GCI count	0
Hidden GCI Count	0

Object property axioms

SubObjectPropertyOf	0
---------------------	---

Ontology imports: [Ontology Prefixes](#) (highlighted with a red box), General class axioms

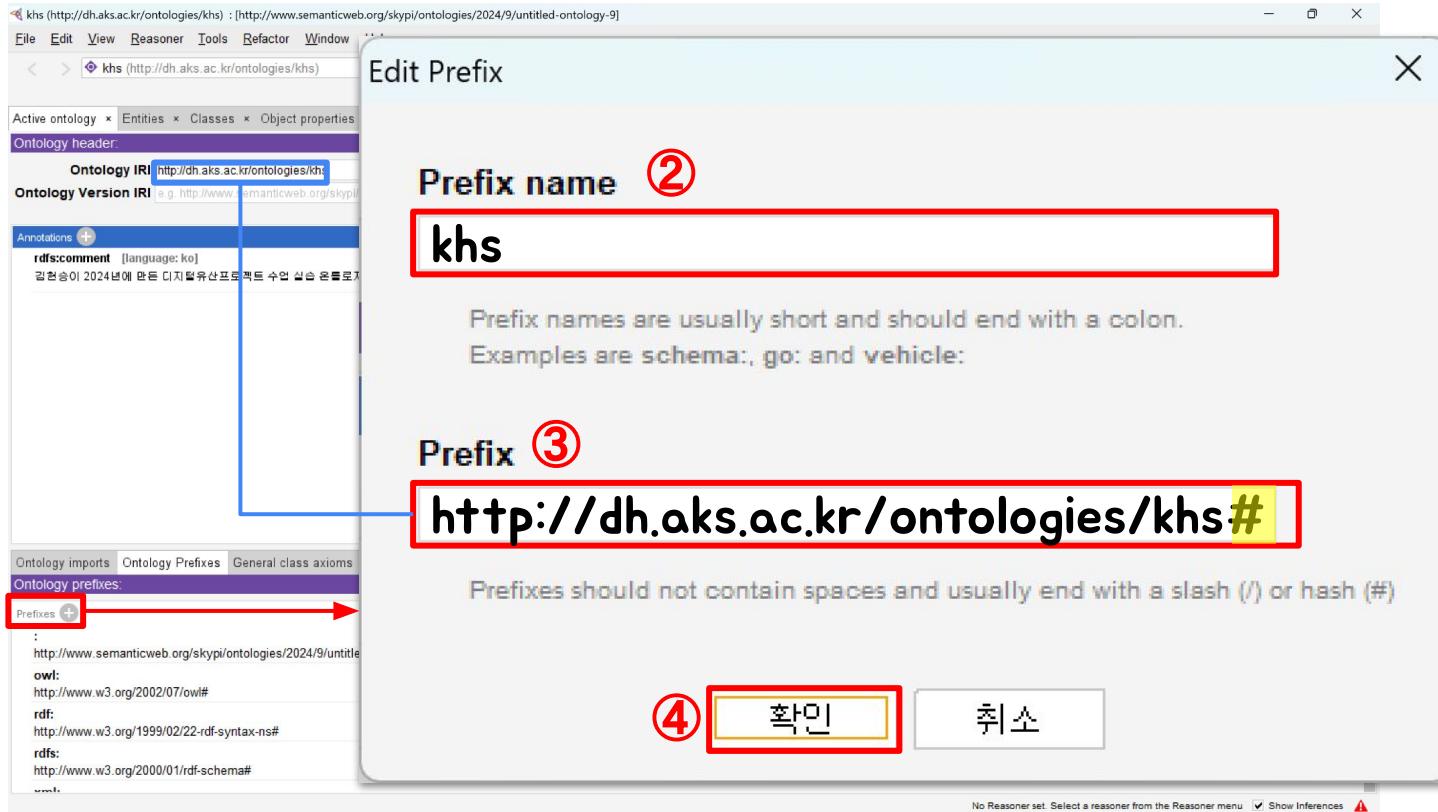
Ontology prefixes:

Prefixes [+](#)

- : <http://www.semanticweb.org/skyp1/ontologies/2024/9/untitled-ontology-9/>
- owl: <http://www.w3.org/2002/07/owl#>
- rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>
- rdfs: <http://www.w3.org/2000/01/rdf-schema#>
- vars:

No Reasoner set. Select a reasoner from the Reasoner menu. Show Inferences

Active Ontology : Ontology Prefixes 추가 (khs)



Active Ontology : Ontology Prefixes 추가 (khs)

The screenshot shows the Protégé ontology editor interface. The top menu bar includes File, Edit, View, Reasoner, Tools, Refactor, Window, and Help. The title bar indicates the ontology is named 'khs' at the URL <http://dh.aks.ac.kr/ontologies/khs>. The main window has tabs for Active ontology, Entities, Classes, Object properties, Data properties, Annotation properties, Individuals by class, OntoGraf, and SPARQL Query. The current tab is 'Ontology header'. The 'Annotations' section contains a single annotation with IRI [rdfs:comment](#) and language `ko`, which reads: '김첨승이 2024년에 만든 디지털유산프로젝트 수업 실습 온보드로지이다.' The right side of the screen displays 'Ontology metrics' with various counts: Axiom (0), Logical axiom count (0), Declaration axioms count (0), Class count (0), Object property count (0), Data property count (0), Individual count (0), and Annotation Property count (1). Below this are sections for 'Class axioms' (SubClassOf, EquivalentClasses, DisjointClasses, GCI count, Hidden GCI Count) and 'Object property axioms' (SubObjectPropertyOf). At the bottom, the 'Ontology prefixes' tab is selected, showing a list of prefixes: `:`, <http://www.semanticweb.org/skypis/ontologies/2024/9/untitled-ontology-9/>, `khs:`, <http://dh.aks.ac.kr/ontologies/khs#>, `owl:`, <http://www.w3.org/2002/07/owl#>, `rdf:`, <http://www.w3.org/1999/02/22-rdf-syntax-ns#>, and `rdfs:`. The prefix `khs:` is highlighted with a red rectangle. A status bar at the bottom right says 'No Reasoner set. Select a reasoner from the Reasoner menu' and 'Show Inferences'.

Active Ontology : Ontology Prefixes 추가 (ekc)

dh.aks.ac.kr/Eencyves/wiki/index.php/EKC_Data_Model-Draft_1.1

로그인

문서 토론

읽기 원본 보기 역사 보기 검색

EKC Data Model-Draft 1.1

한국문화 앤사이브 온톨로지

Ontology Design for the Encyclopedic Archives of Korean Culture

목차 [숨기기]

- 1 온톨로지란? What is Ontology
- 2 온톨로지 설계 용어 Terms for Ontology Design
- 3 Encyclopedic Archives of Korean Culture Data Model Draft 1.1
 - 3.1 Core Class
 - 3.2 Contextual Class
 - 3.3 Relation (Object Property)
- 4 Previous Version
- 5 Project 별 Ontology 설계 시안
- 6 Ontology Reference

온톨로지란? What is Ontology

• '온톨로지'란 정보화의 대상이 되는 세계를 전자적으로 표현할 수 있도록 구성한 데이터 기술 체계이다. 원래 온톨로지라는 말은 철학에서 '존재론'이라고 번역되는 용어로서 '존재에 대한 이해를 추구하는 학문'의 의미를 갖는 말이었다. 그러한 용어가 정보과학 분야에서 중요한 개념으로 등장하게 된 것은 인간이 세계를 이해하는 틀과 컴퓨터가 정보화 대상(콘텐츠)을 이해하는 틀 사이에 유사성이 있다고 보았기 때문이다. 그 틀은 바로 대상을 구성하는 요소들에 대응하는 개념들과 그 개념들 간의 연관 관계이다.^[1] 넓은 의미에서는 모든 정보화의 틀이 다 온톨로지일 수 있겠지만, 대상 자원을 '클래스(class)'로 범주화하고, 각각의 클래스에 속하는 개체(individuals)들이 공통의 '속성(attribute)'을 갖도록 하고, 그 개체들이 다른 개체들과 맺는 '관계(relation)'를 명시적으로 기술하는 것이 가장 일반적인 온톨로지 설계 방식이라고 할 수 있다. (김현, 「디지털 인문학 입문」(HUEBOOKS, 2016)^[2] p. 164)

• 정보기술 분야에서 말하는 '온톨로지(ontology)'에 대한 가장 일반적인 정의는 그루버(Gruber, Thomas. 1959~)가 말한 '명시적 명세화의 방법에 의한 개념화(explicit specification of a conceptualization)'이다.^[2] 여기서 '개념화'(conceptualization)라는 것은 정보화하고자 하는 대상 세계를 일정한 체계 속에서 파악하는 것, 예를 들면 그 세계에 무엇이 있고, 그것은 어떤 속성을 품고 있으며. 그것들 사이의 관계는 무엇인가 하는 일정한 질문의 틀 속에서 대상 세계를 이해하는 방식이라고 할 수 있다. '명세화'(specification)란 대상 세계에 존재하는 개체, 속성,

Active Ontology : Ontology Prefixes 추가 (ekc)

The screenshot shows the Skippy ontology editor interface. A modal window titled "Edit Prefix" is open, prompting for a "Prefix name" (②) which is "ekc". Below the input field, a note states: "Prefix names are usually short and should end with a colon. Examples are schema:, go: and vehicle:". A "Prefix" button (③) is visible at the bottom of the modal. In the background, the main ontology editor window shows the "Ontology header" tab selected, displaying the "Ontology IRI" as <http://dh.aks.ac.kr/ontologies/khs>. On the left sidebar, the "Ontology prefixes" section (①) is open, showing a list of prefixes including "owl:", "rdf:", "rdfs:", and "xsd:". At the bottom right of the modal, there are "확인" (Confirm) and "취소" (Cancel) buttons (④). A status bar at the bottom of the editor window indicates: "No Reasoner set. Select a reasoner from the Reasoner menu" and "Show Inferences".

Prefix name ②

ekc

Prefix names are usually short and should end with a colon.
Examples are schema:, go: and vehicle:

Prefix ③

①

②

③

④

<http://dh.aks.ac.kr/ontologies/encyclopedicarchivesofkoreanculture#>

Ontology imports Ontology Prefixes General class axioms
Ontology prefixes:
Prefixes ①
owl:
rdf:
rdfs:
xsd:
http://www.w3.org/2002/07/owl#
http://www.w3.org/1999/02/22-rdf-syntax-ns#
http://www.w3.org/2000/01/rdf-schema#

Prefixes should not contain spaces and usually end with a slash (/) or hash (#)

No Reasoner set. Select a reasoner from the Reasoner menu Show Inferences

Active Ontology : Ontology Prefixes 추가 (ekc)

The screenshot shows the OntoGraf interface for managing an ontology. The top navigation bar includes File, Edit, View, Reasoner, Tools, Refactor, Window, and Help. The title bar indicates the ontology is at <http://dh.aks.ac.kr/ontologies/khs>. The main window has tabs for Active ontology, Entities, Classes, Object properties, Data properties, Annotation properties, Individuals by class, OntoGraf, and SPARQL Query. The current tab is Active ontology.

Ontology header:

- Ontology IRI: <http://dh.aks.ac.kr/ontologies/khs>
- Ontology Version IRI: e.g. <http://www.semanticweb.org/skyp1/ontologies/2024/9/untitled-ontology-9/1.0.0>

Annotations: A comment in Korean is present: "김첨승이 2024년에 만든 디지털유산프로젝트 수업 실습 온보드로지이다."

Metrics:

Metric	Count
Axiom	0
Logical axiom count	0
Declaration axioms count	0
Class count	0
Object property count	0
Data property count	0
Individual count	0
Annotation Property count	1

Class axioms:

Axiom Type	Count
SubClassOf	0
EquivalentClasses	0
DisjointClasses	0
GCI count	0
Hidden GCI Count	0

Object property axioms:

Axiom Type	Count
SubObjectPropertyOf	0

Ontology imports: None listed.

Ontology Prefixes:

Prefixes: [+](#)

- : <http://www.semanticweb.org/skyp1/ontologies/2024/9/untitled-ontology-9/>
- ekc: <http://dh.aks.ac.kr/ontologies/encyclopedicarchivesofkoreanculture#>
- khs: <http://dh.aks.ac.kr/ontologies/khs#>
- owl: <http://www.w3.org/2002/07/owl#>
- rdf: [rdf#](#)

Bottom status bar: No Reasoner set. Select a reasoner from the Reasoner menu. Show Inferences ⚠

Active Ontology : Ontology Prefixes 추가 (dcterms)

Google

dcterms url

검색

X



전체

이미지

동영상

쇼핑

뉴스

웹

도서

⋮ 더보기

도구

도움말: 결과를 [한국어](#)로 표시합니다. 언어별 필터링에 대해서도 자세히 알아보세요.



DCMI

<https://www.dublincore.org> › specifications › dublin-core ⋮

DCMI Metadata Terms

2020. 1. 20. — As a result, there exists both a dc:date (<http://purl.org/dc/elements/1.1/date>) with no formal range and a corresponding [dcterms:date](#) (<http://purl.org/dc/terms/date>).

[Title](#) · [Creator](#) · [Release History](#) · [Type](#)

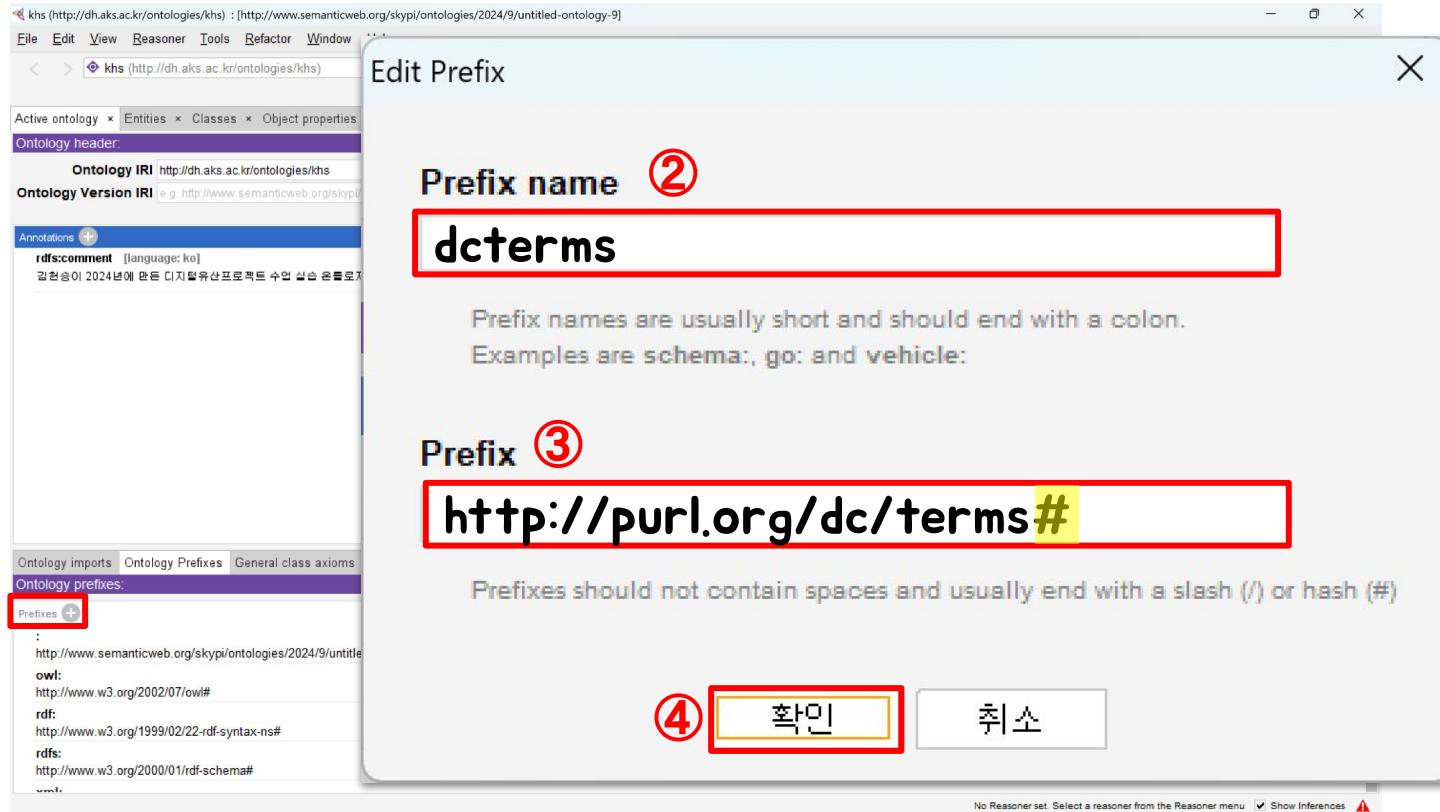
Active Ontology : Ontology Prefixes 추가 (dcterms)

The four DCMI namespaces are:

- <http://purl.org/dc/elements/1.1/> The /elements/1.1/ namespace was created in 2000 for the RDF representation of the fifteen-element Dublin Core and has been widely used in data for more than twenty years. This namespace corresponds to the original scope of ISO 15836, which was published first in 2003 and last revised in 2017 as ISO 15836-1:2017 [[ISO 15836-1:2017](#)].
- <http://purl.org/dc/terms/> The /terms/ namespace was originally created in 2001 for identifying new terms coined outside of the original fifteen-element Dublin Core. In 2008, in the context of defining formal semantic constraints for DCMI metadata terms in support of RDF applications, the original fifteen elements themselves were mirrored in the /terms/ namespace. As a result, there exists both a `dc:date` (<http://purl.org/dc/elements/1.1/date>) with no formal range and a corresponding `dcterms:date` (<http://purl.org/dc/terms/date>) with a formal range of "literal". While these distinctions are significant for creators of RDF applications, most users can safely treat the fifteen parallel properties as equivalent. The most useful properties and classes of DCMI Metadata Terms have now been published as ISO 15836-2:2019 [[ISO 15836-2:2019](#)]. While the /elements/1.1/ namespace will be supported indefinitely, DCMI gently encourages use of the /terms/ namespace.
- <http://purl.org/dc/dcmitype/> The /dcmitype/ namespace was created in 2001 for the DCMI Type Vocabulary, which defines classes for basic types of thing that can be described using DCMI metadata terms.
- <http://purl.org/dc/dcam/> The /dcam/ namespace was created in 2008 for terms used in the *description* of DCMI metadata terms.

Each term is specified with the following minimal set of attributes:

Active Ontology : Ontology Prefixes 추가 (dcterms)



Active Ontology : Ontology Prefixes 추가 (dcterms)

The screenshot shows the Protégé ontology editor interface. The title bar indicates the ontology is named 'khs' and is located at 'http://dh.aks.ac.kr/ontologies/khs'. The menu bar includes File, Edit, View, Reasoner, Tools, Refactor, Window, and Help. The toolbar has buttons for back, forward, and search.

The main window has tabs for Active ontology, Entities, Classes, Object properties, Data properties, Annotation properties, Individuals by class, OntoGraf, and SPARQL Query. The 'Ontology header' tab is selected, showing the Ontology IRI as 'http://dh.aks.ac.kr/ontologies/khs' and the Ontology Version IRI as 'e.g. http://dh.aks.ac.kr/ontologies/khs/1.0.0'. Below this is an 'Annotations' section with a plus sign.

The right side of the interface displays 'Ontology metrics' and 'Metrics' table:

Metrics	Value
Axiom	0
Logical axiom count	0
Declaration axioms count	0
Class count	0
Object property count	0
Data property count	0
Individual count	0
Annotation Property count	0

Below the metrics are sections for 'Class axioms' and 'Object property axioms', both currently showing 0 counts.

The 'Ontology prefixes' tab is selected, showing a list of prefixes:

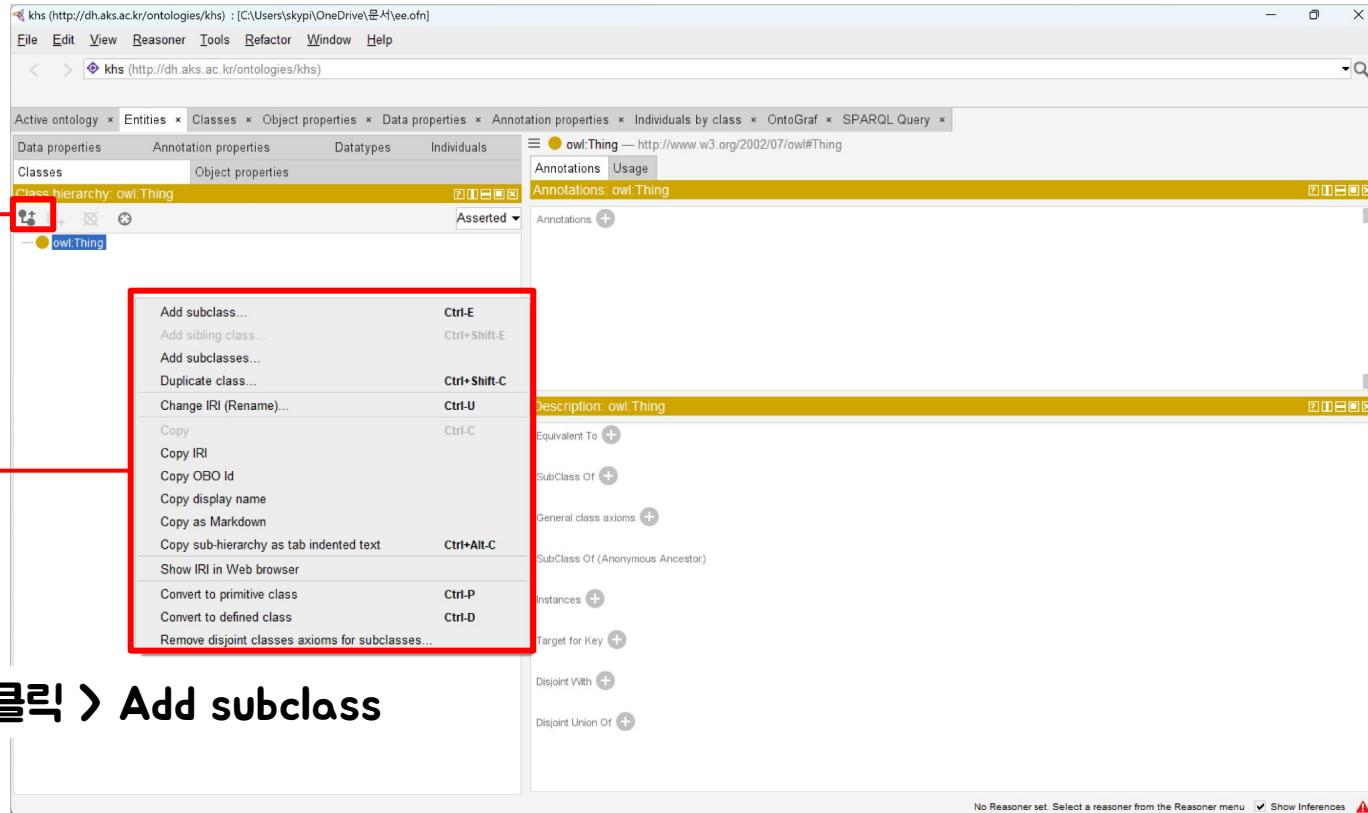
- : (empty)
- <http://www.semanticweb.org/skypoi/ontologies/2024/9/untitled-ontology-10/>
- dcterms:** <http://purl.org/dc/terms#> (This line is highlighted with a red rectangle)
- ekc:
<http://dh.aks.ac.kr/ontologies/encyclopedicarchivesofkoreanculture#>
- khs:
<http://dh.aks.ac.kr/ontologies/khs#>
- owl:
<http://www.w3.org/2002/07/owl#>

At the bottom of the interface, there is a note: 'No Reasoner set. Select a reasoner from the Reasoner menu.' and a checkbox for 'Show Inferences'.

4

프로테제 실습 - Entities

Entities : Sub Class 추가



Entities : Sub Class 추가

The screenshot shows the OntoGraf interface for managing an ontology named 'khs'. The main window displays a class hierarchy where 'owl:Thing' is the root node. A modal dialog titled 'Create a new Class' is open, prompting for a name ('Actor') and IRI ('http://dh.aks.ac.kr/ontologies/khs#Actor'). The 'Name' field is highlighted with a red border, and the 'IRI' field is highlighted with a pink border. A red arrow labeled '② 입력' points to the 'Name' field. At the bottom of the dialog are two buttons: '확인' (Confirm) and '취소' (Cancel). In the top right corner of the dialog, there is a link 'New entity options...'. The background shows the standard navigation and search bar of the OntoGraf application.

② 입력

Create a new Class

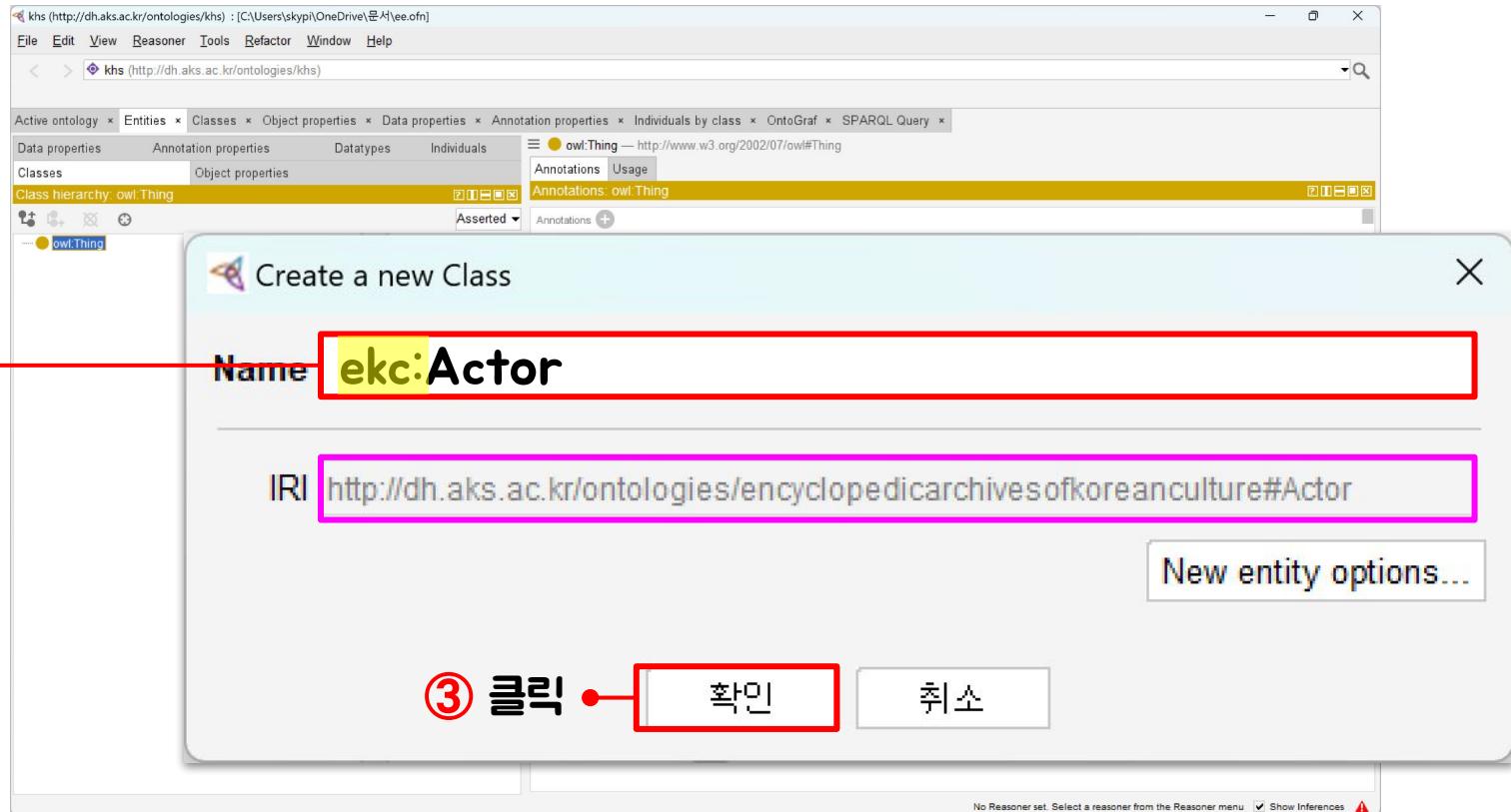
Name **Actor**

IRI **http://dh.aks.ac.kr/ontologies/khs#Actor**

New entity options...

확인 취소

Entities : Sub Class 추가

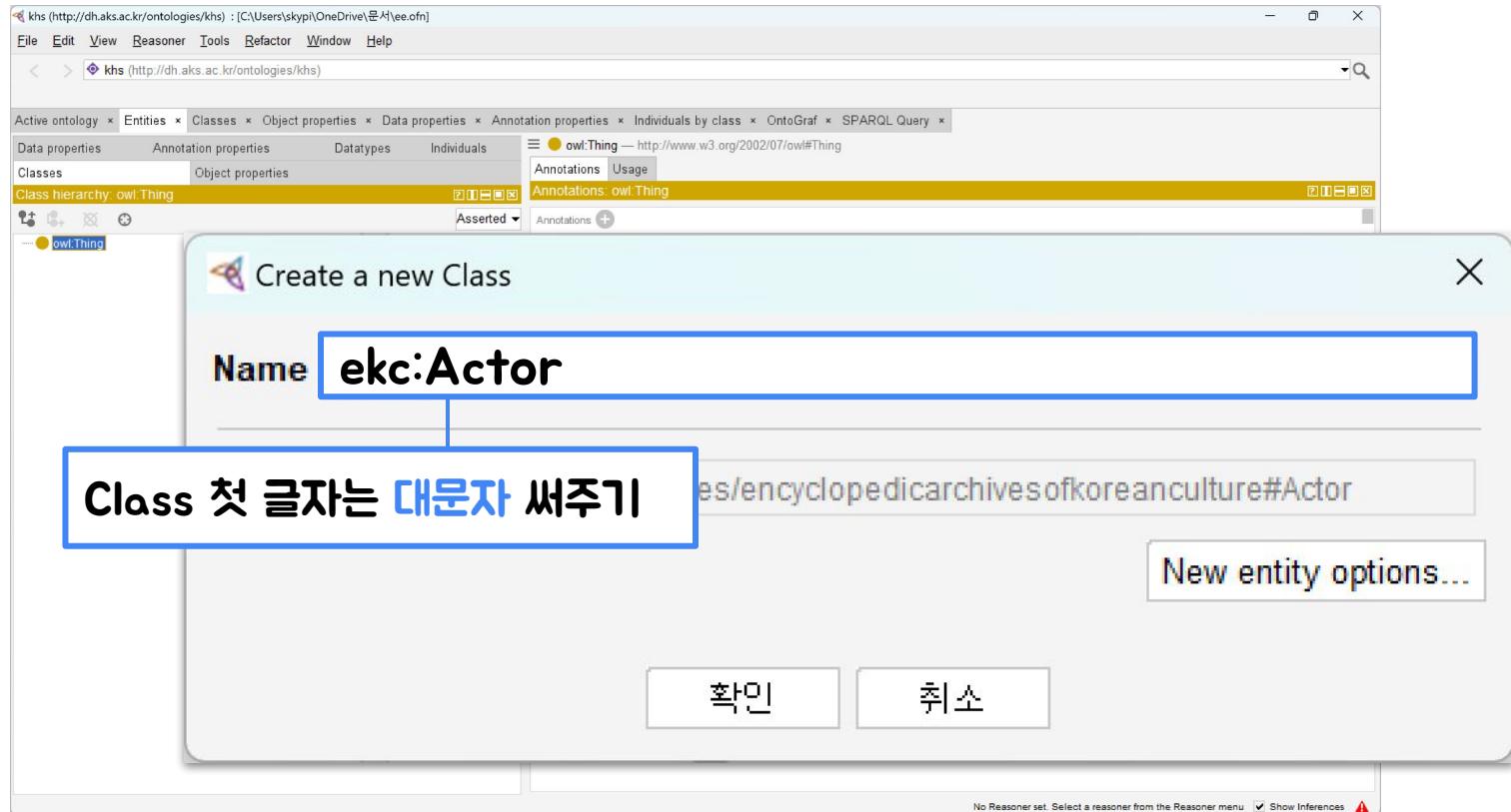


Entities : Sub Class 추가

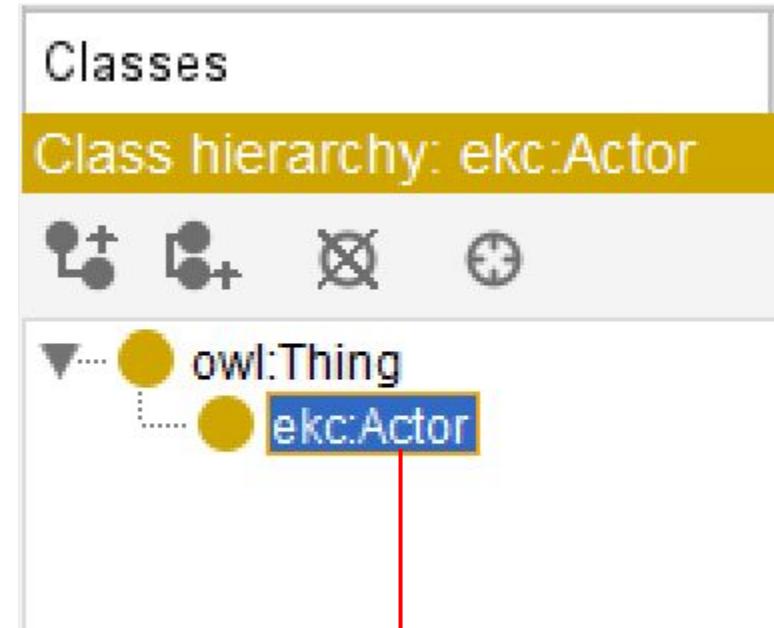
The screenshot shows the Protégé ontology editor interface. The top menu bar includes File, Edit, View, Reasoner, Tools, Refactor, Window, and Help. The title bar indicates the active ontology is 'khs' (http://dh.aks.ac.kr/ontologies/khs) located at [C:\Users\skyp\OneDrive\문서\ee.ofn]. The main window has tabs for Active ontology, Entities, Classes, Object properties, Data properties, Annotation properties, Individuals by class, OntoGraf, and SPARQL Query. The 'Classes' tab is selected. A sub-menu under 'Classes' shows 'Data properties', 'Annotation properties', 'Datatypes', and 'Individuals'. Below this is a 'Class hierarchy' section with 'ekc:Actor' expanded, showing it is a subclass of 'owl:Thing'. A red box highlights this section. To the right, the 'Annotations' tab is selected, showing annotations for 'ekc:Actor'. Another red box highlights this tab. A large red arrow points from the 'Annotations' tab to the 'ekc:Actor' entry in the list. The bottom right corner of the interface displays the message: 'No Reasoner set. Select a reasoner from the Reasoner menu' with a checked checkbox for 'Show Inferences'.

추가한 클래스의 풀비전 URI 확인

※ Class 규칙

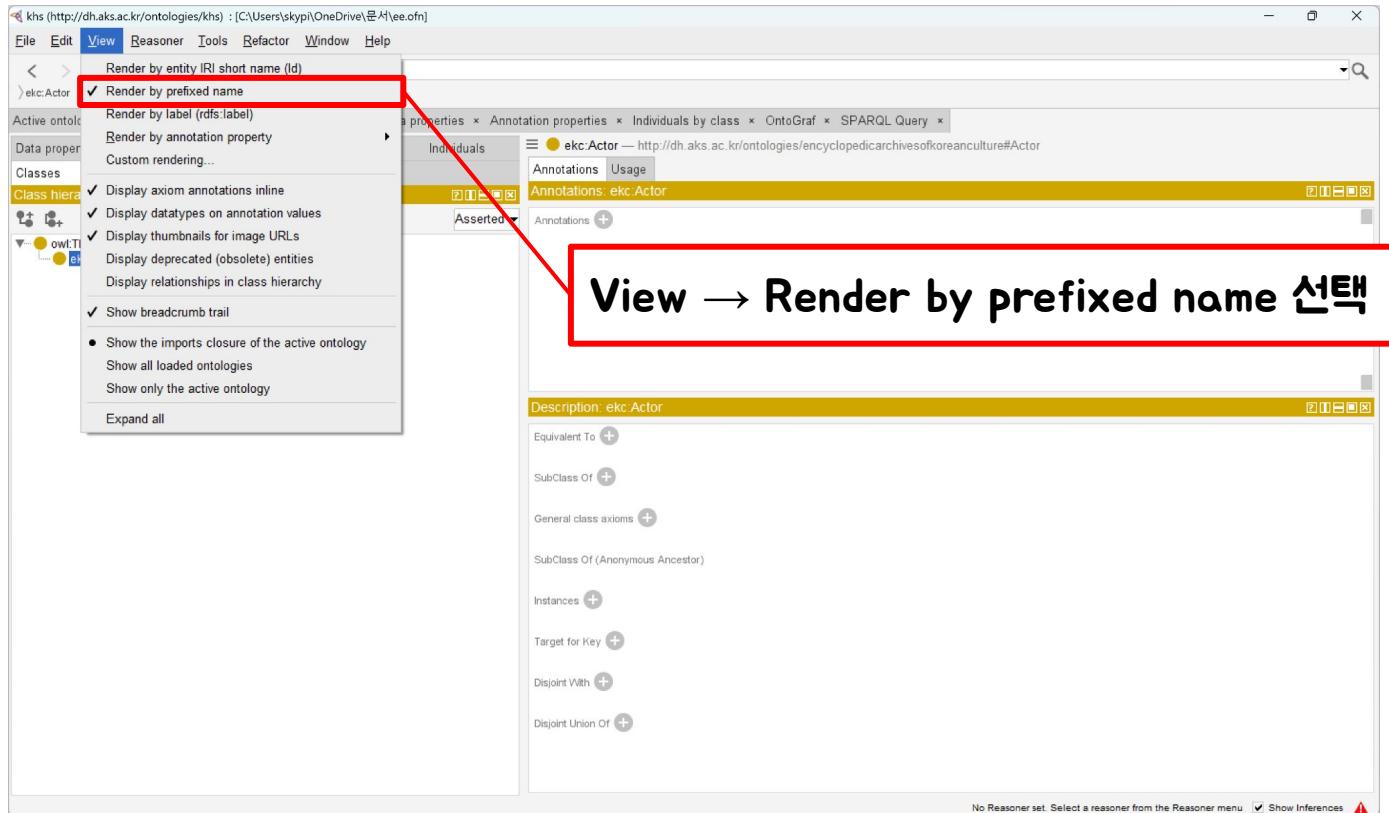


※ View : Render by prefixed name

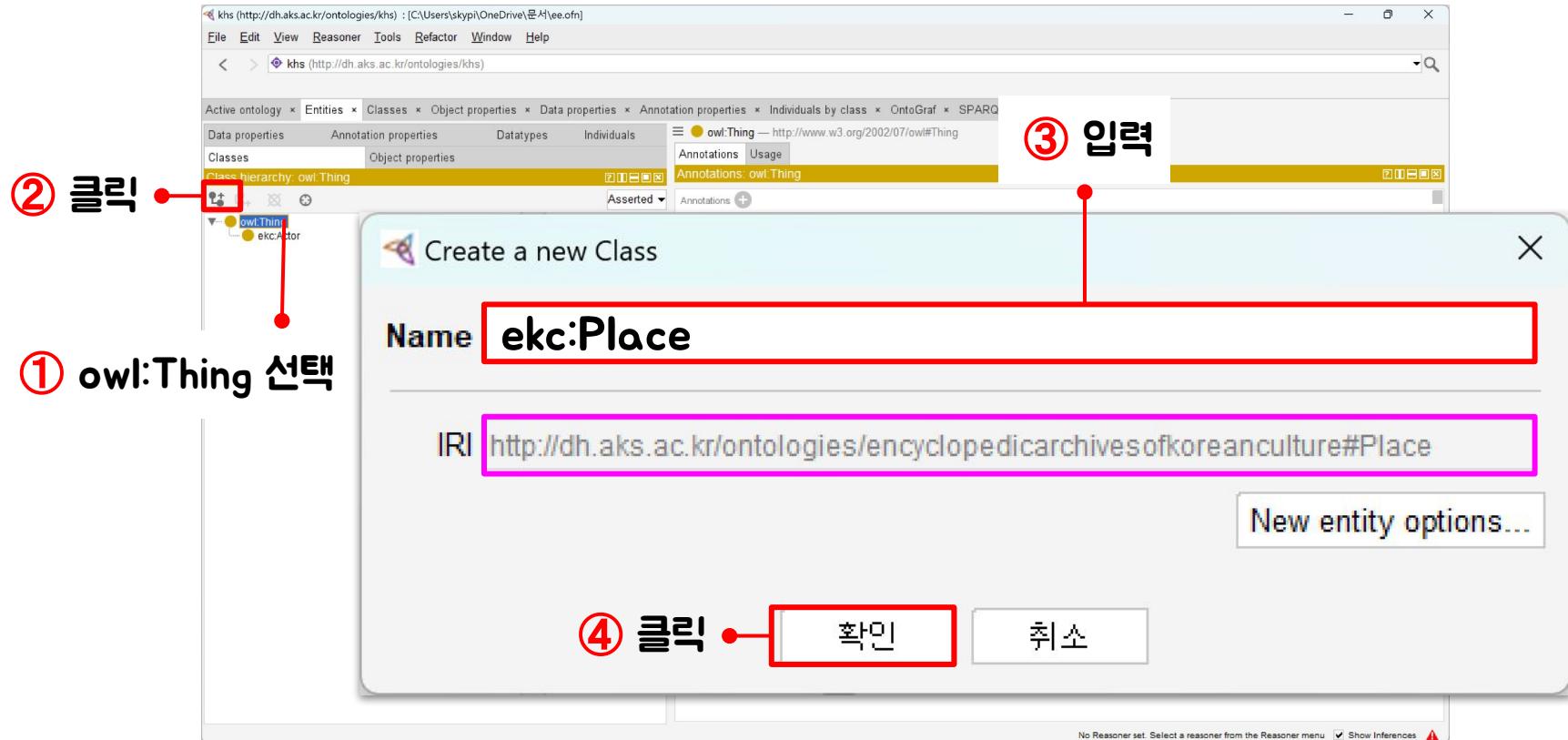


만약 글씨가 이렇게 보이지 않는다면,

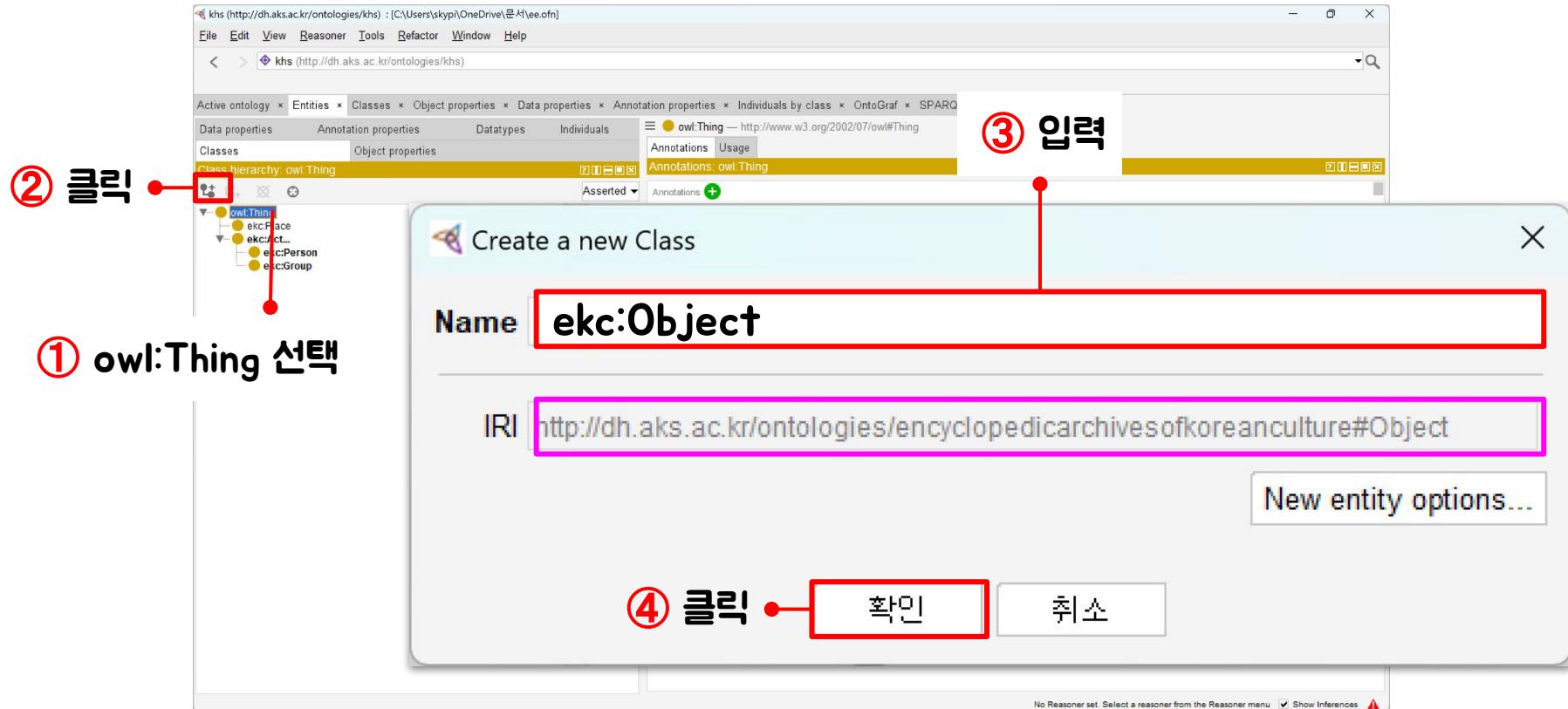
※ View : Render by prefixed name



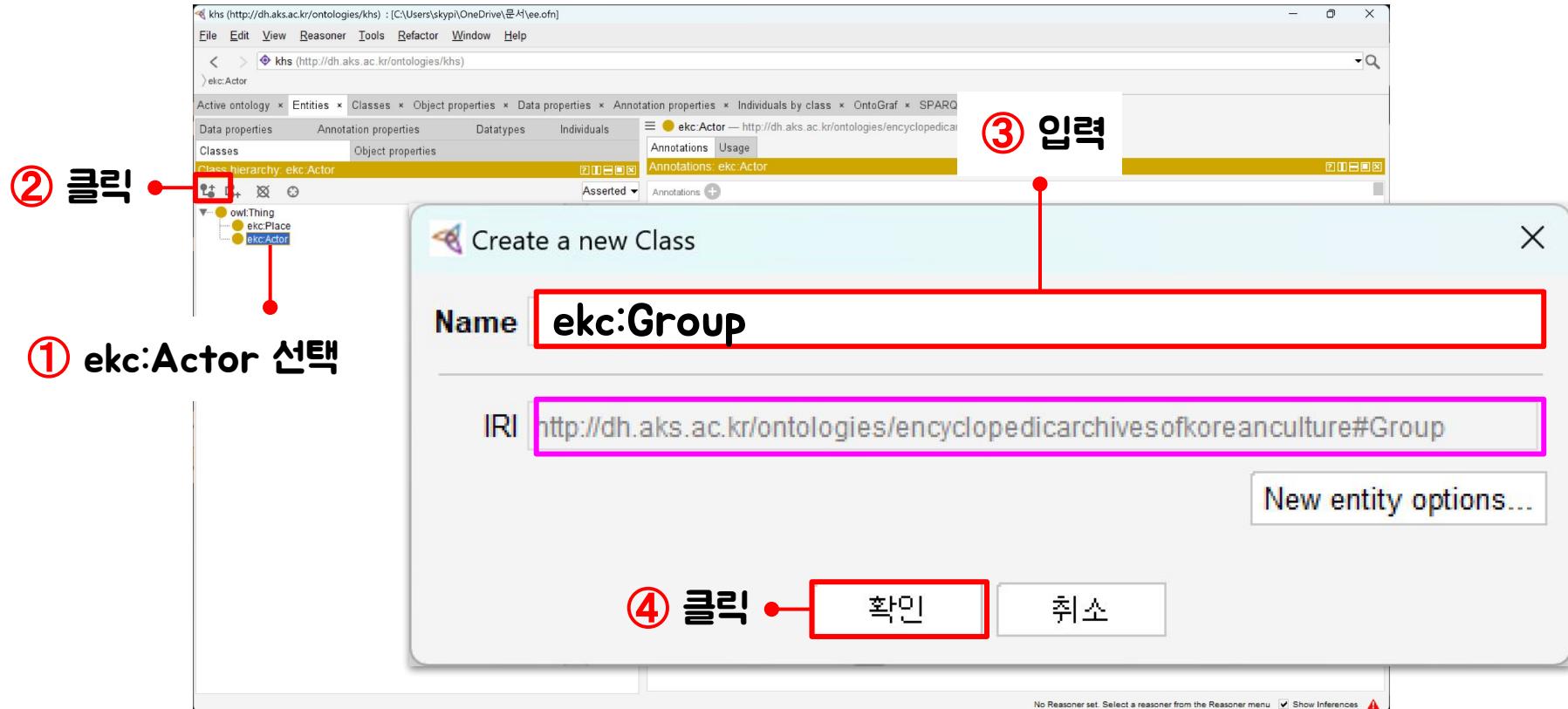
Entities : Sub Class 추가



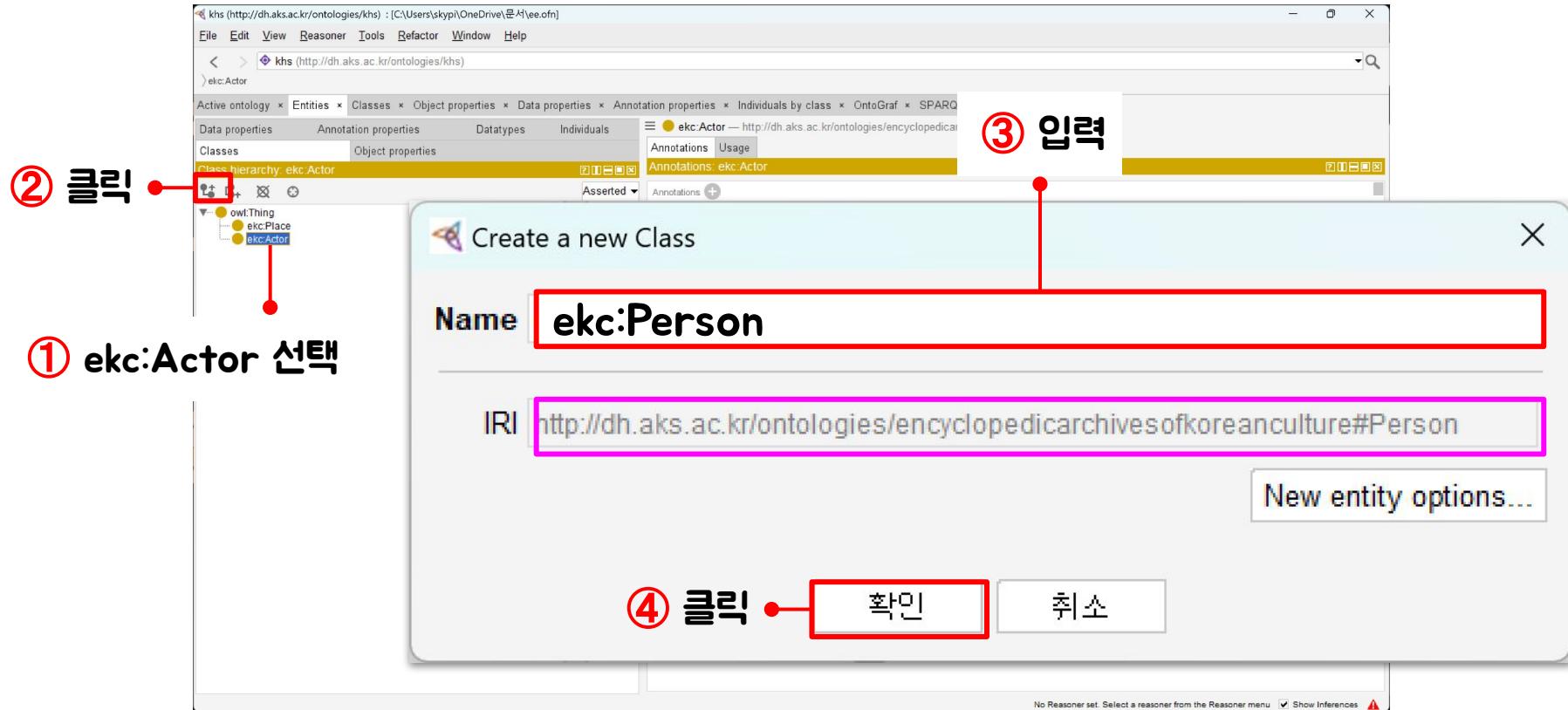
Entities : Sub Class 추가



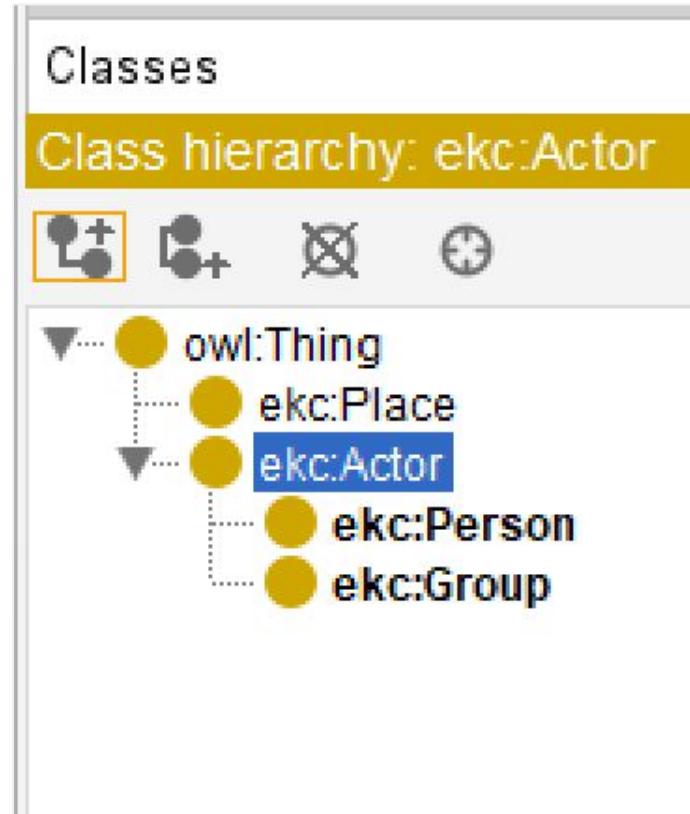
Entities : Sub Class 추가



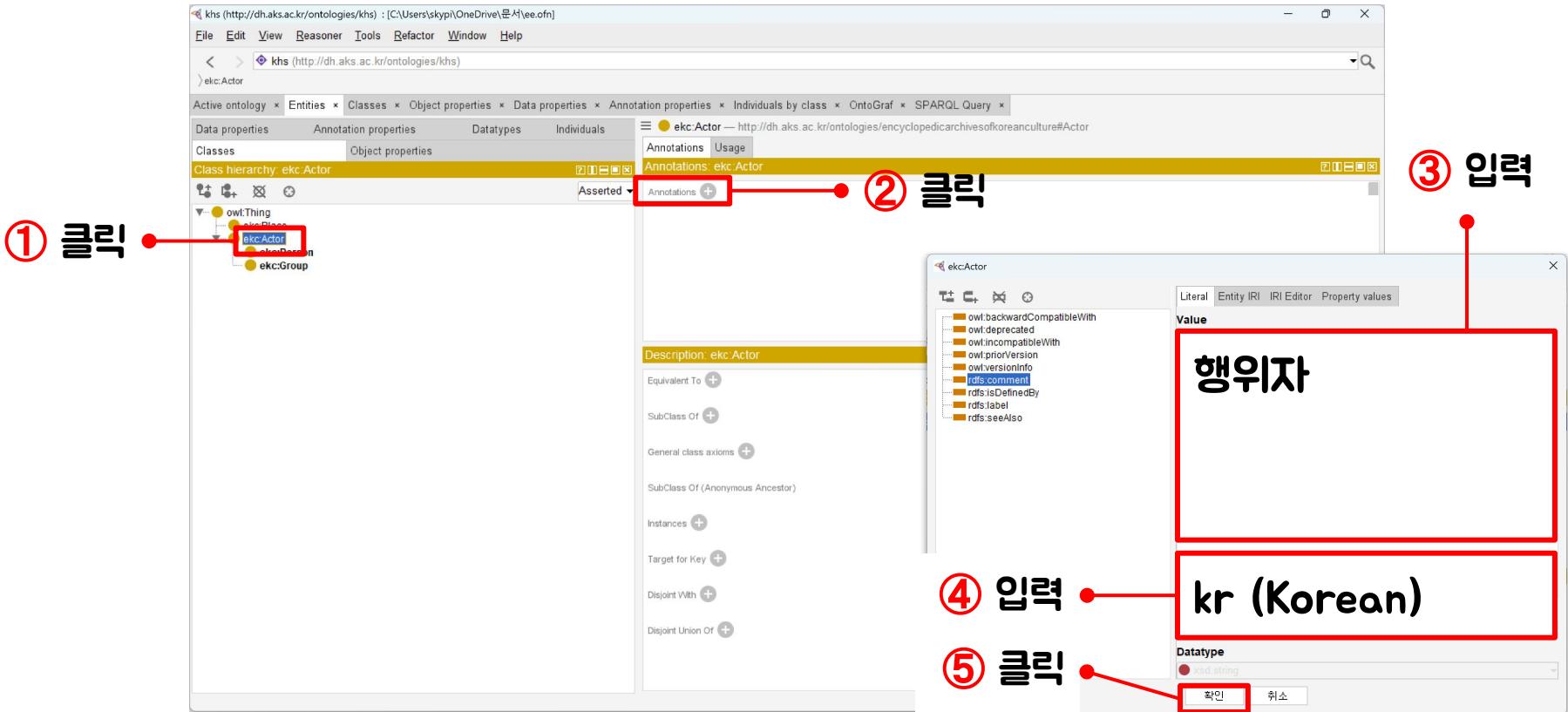
Entities : Sub Class 추가



Entities : Sub Class 추가

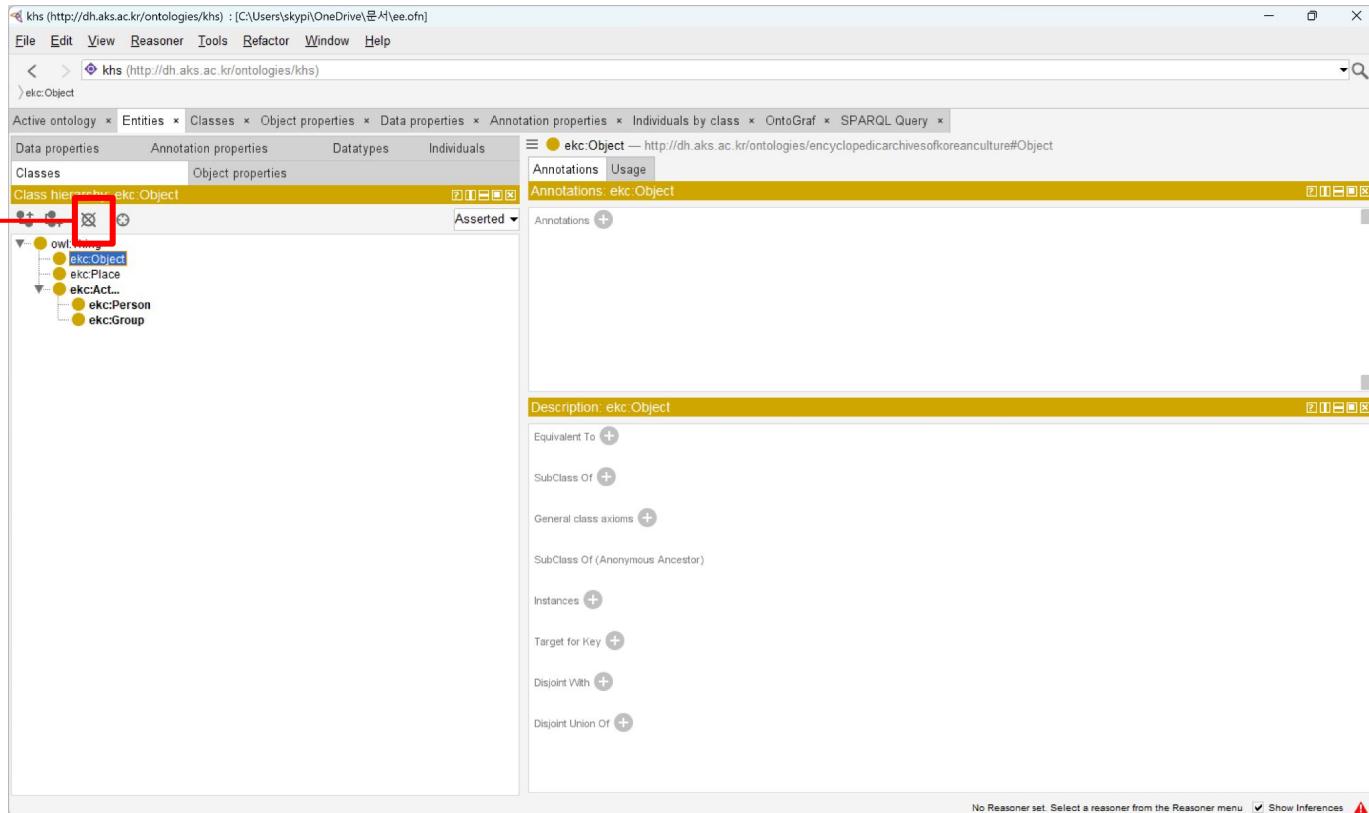


Entities : Class Annotation 입력

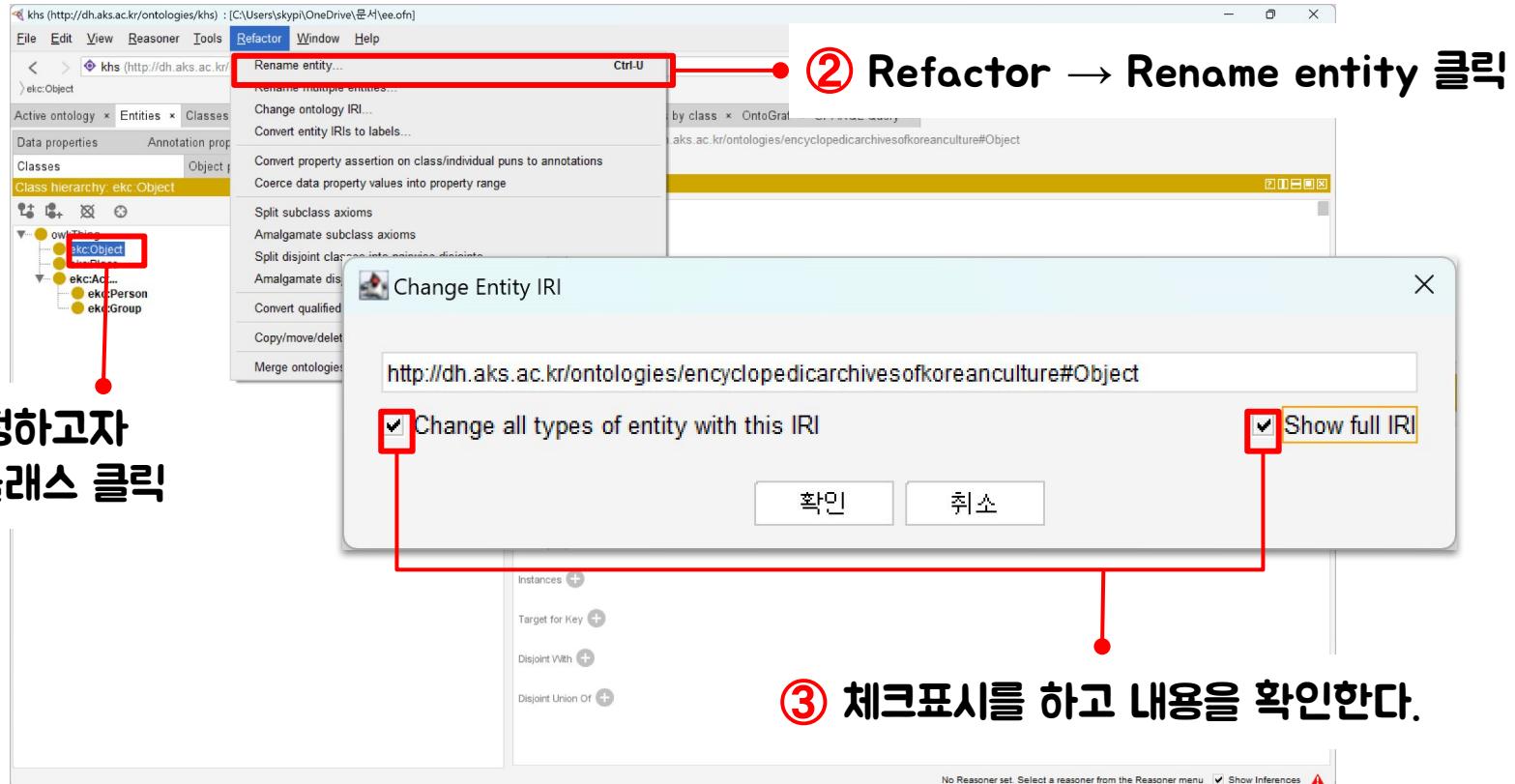


※ Delete (삭제)

클릭



※ Rename entity (수정)





5

프로테제 실습 - Object properties

Object properties : Sub Property 추가

The screenshot shows the Protégé ontology editor interface. The top navigation bar includes File, Edit, View, Reasoner, Tools, Refactor, Window, and Help. Below the bar, tabs for Active ontology, Entities, Classes, Object properties (selected), Data properties, Annotation properties, Individuals by class, OntoGraf, and SPARQL Query are visible. A search bar is at the top right.

The main area displays the "Object property hierarchy: owl:topObjectProperty". A red box highlights the node "owl:topObjectProperty". A red arrow points from this highlighted node down to the text "모든 Object Property 의 최상위".

The right panel shows the "Annotations: owl:topObjectProperty" tab, which contains a list of annotations:

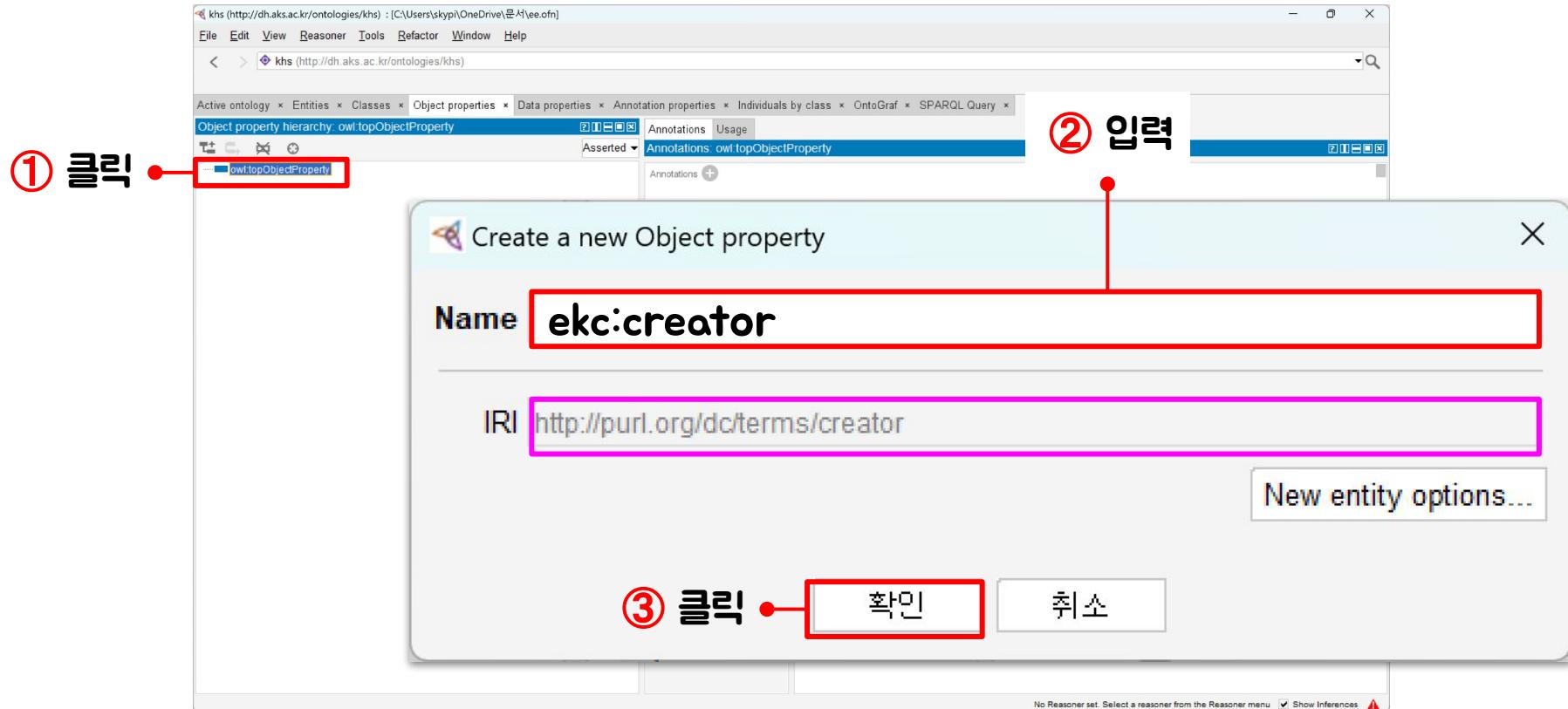
- Equivalent To +
- SubProperty Of +
- Inverse Of +
- Domains (intersection) +
- Ranges (intersection) +
- Disjoint With +
- SuperProperty Of (Chain) +

On the left, there is a sidebar with checkboxes for property types: Functional, Inverse functional, Transitive, Symmetric, Asymmetric, Reflexive, and Irreflexive.

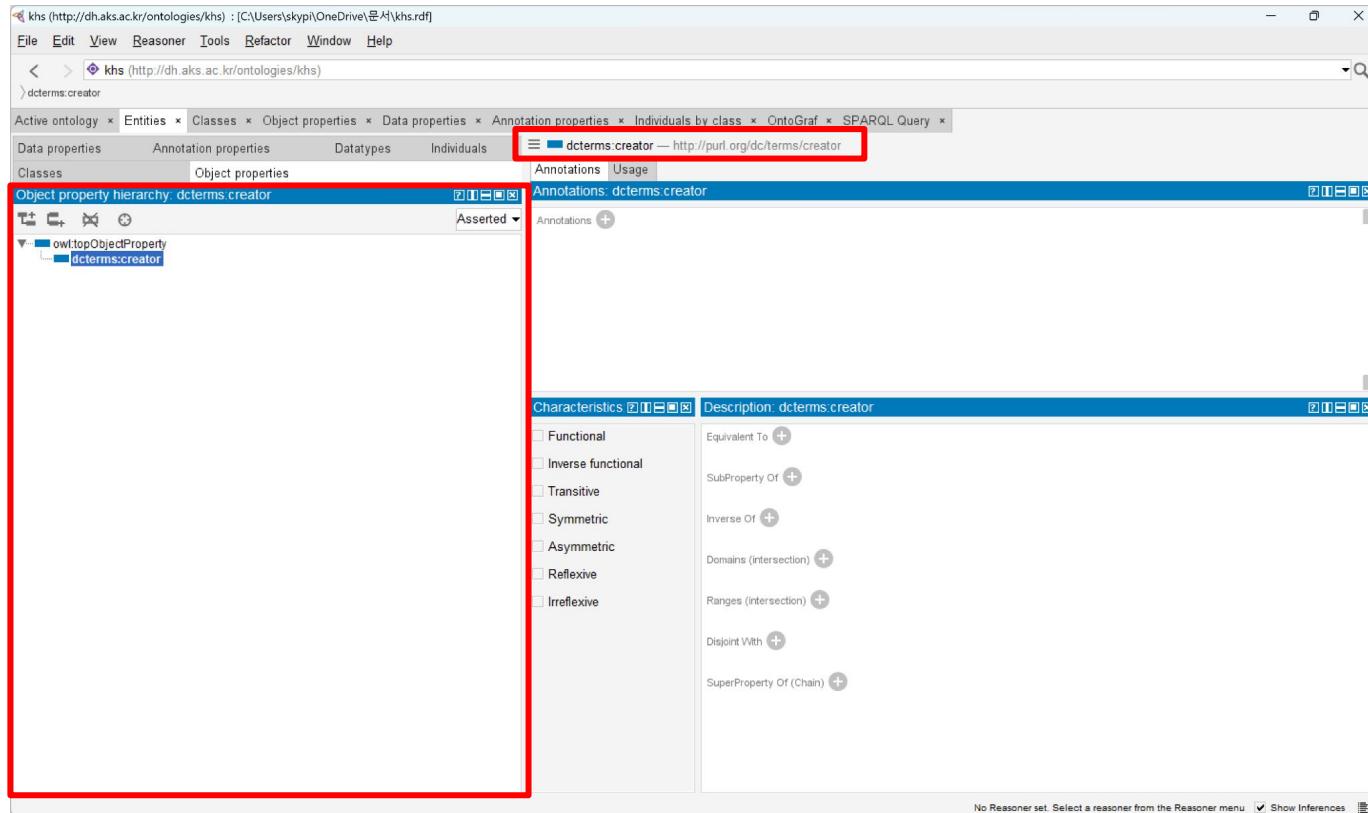
At the bottom of the interface, a status bar reads: "No Reasoner set. Select a reasoner from the Reasoner menu" and "Show Inferences".

모든 Object Property 의 최상위

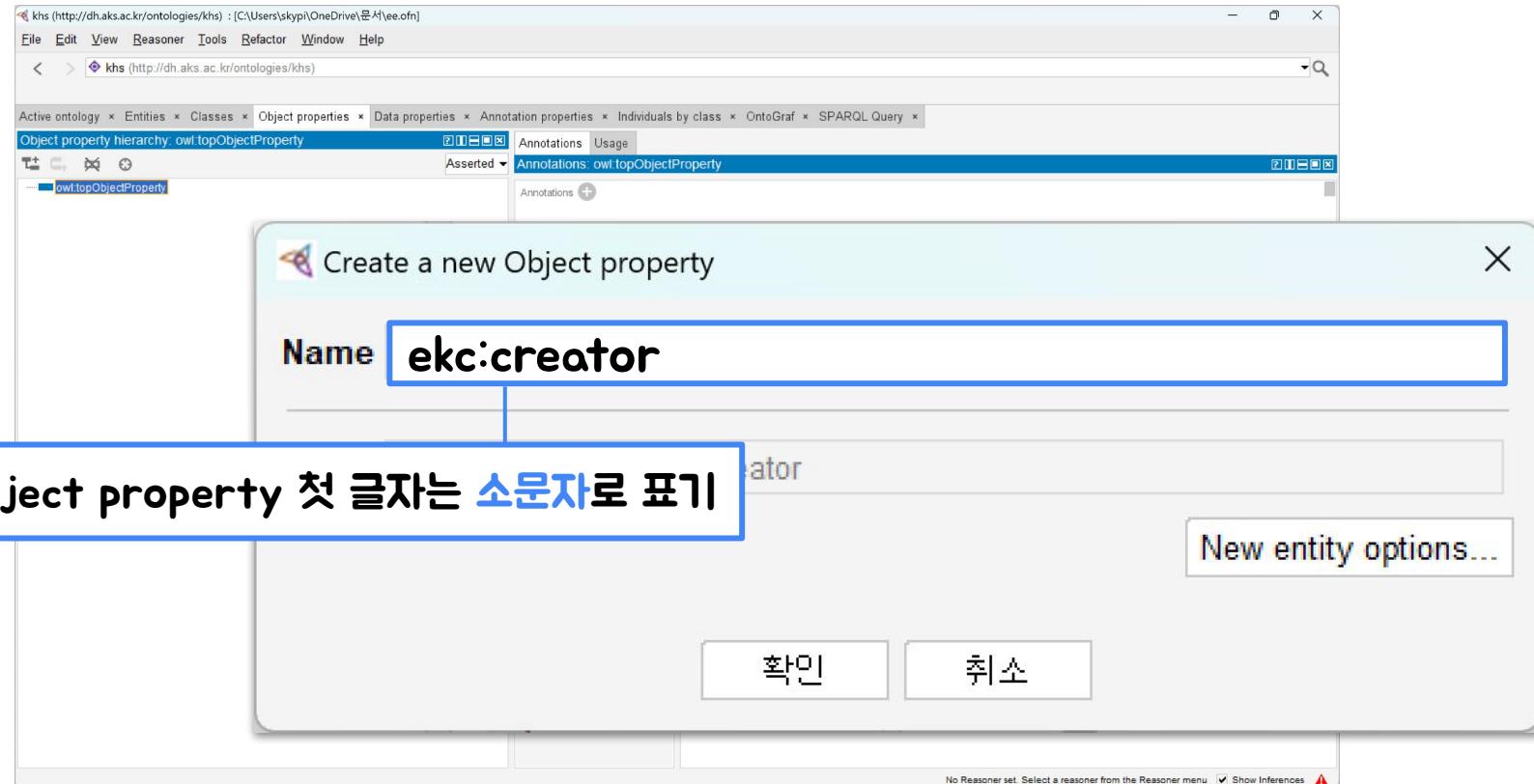
Object properties : Sub Property 추가



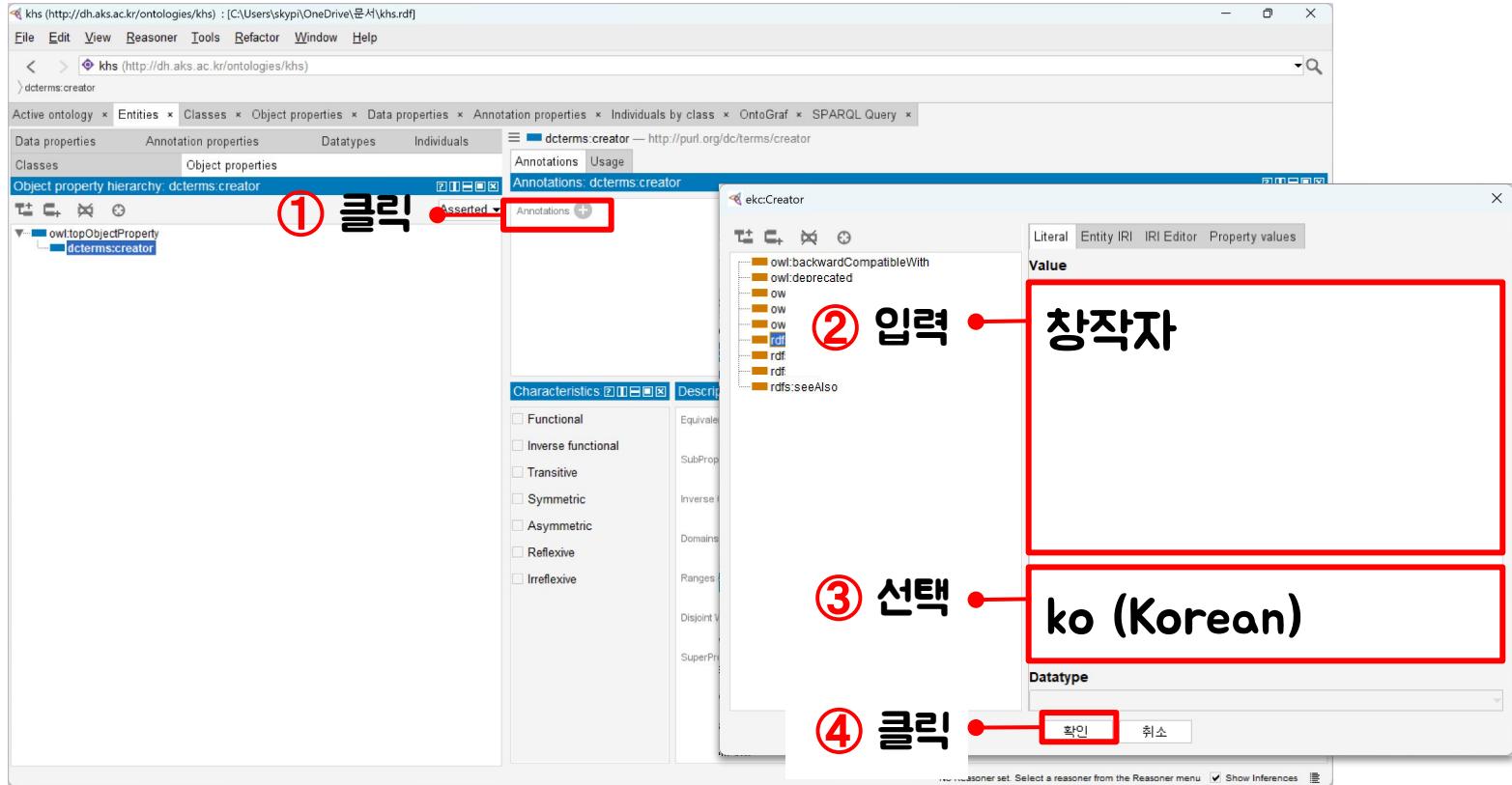
Object properties : Sub Property 추가



※ Object property 규칙



Object properties : Property Annotation 입력



Object properties : Property Annotation 입력

The screenshot shows the OntoGraf application interface for managing ontologies. The main window title is "khs (http://dh.aks.ac.kr/ontologies/khs) : [C:\Users\skypy\OneDrive\문서\khs.rdf]". The menu bar includes File, Edit, View, Reasoner, Tools, Refactor, Window, and Help. The toolbar has icons for back, forward, search, and other navigation.

The active ontology is "dcterms:creator". The tabs at the top are Active ontology, Entities, Classes, Object properties, Data properties, Annotation properties, Datatypes, and Individuals. The "Object properties" tab is selected. The sub-tabs are Data properties, Annotation properties, and Object properties. The "Object property hierarchy: dcterms:creator" section shows "owl:topObjectProperty" and "dcterms:creator".

The main workspace displays the "Annotations" tab for "dcterms:creator". A red box highlights the annotations section, which contains:

- rdfs:comment [language: ko]
작자

Below this, the "Characteristics" section lists:

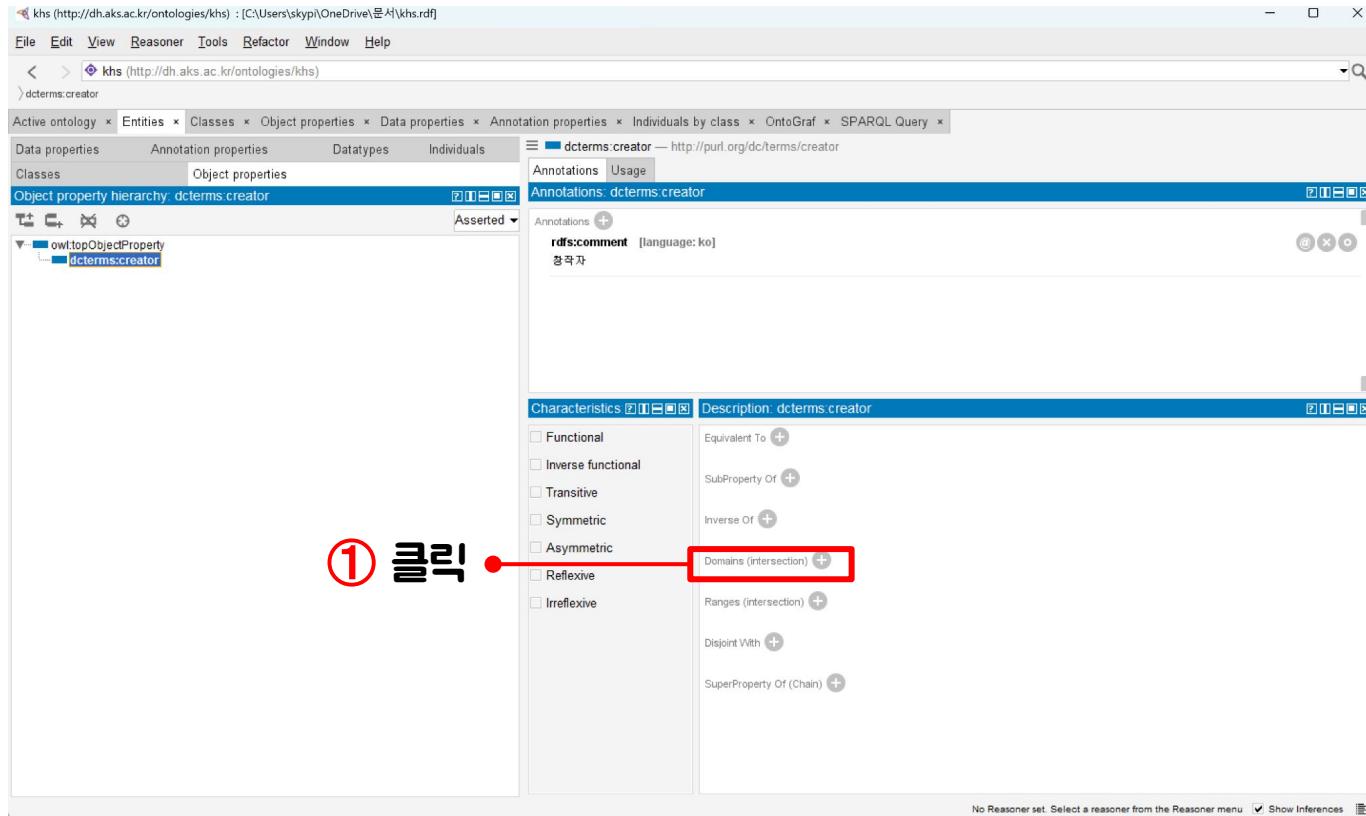
- Functional
- Inverse functional
- Transitive
- Symmetric
- Asymmetric
- Reflexive
- Irreflexive

The "Description: dcterms:creator" section on the right lists:

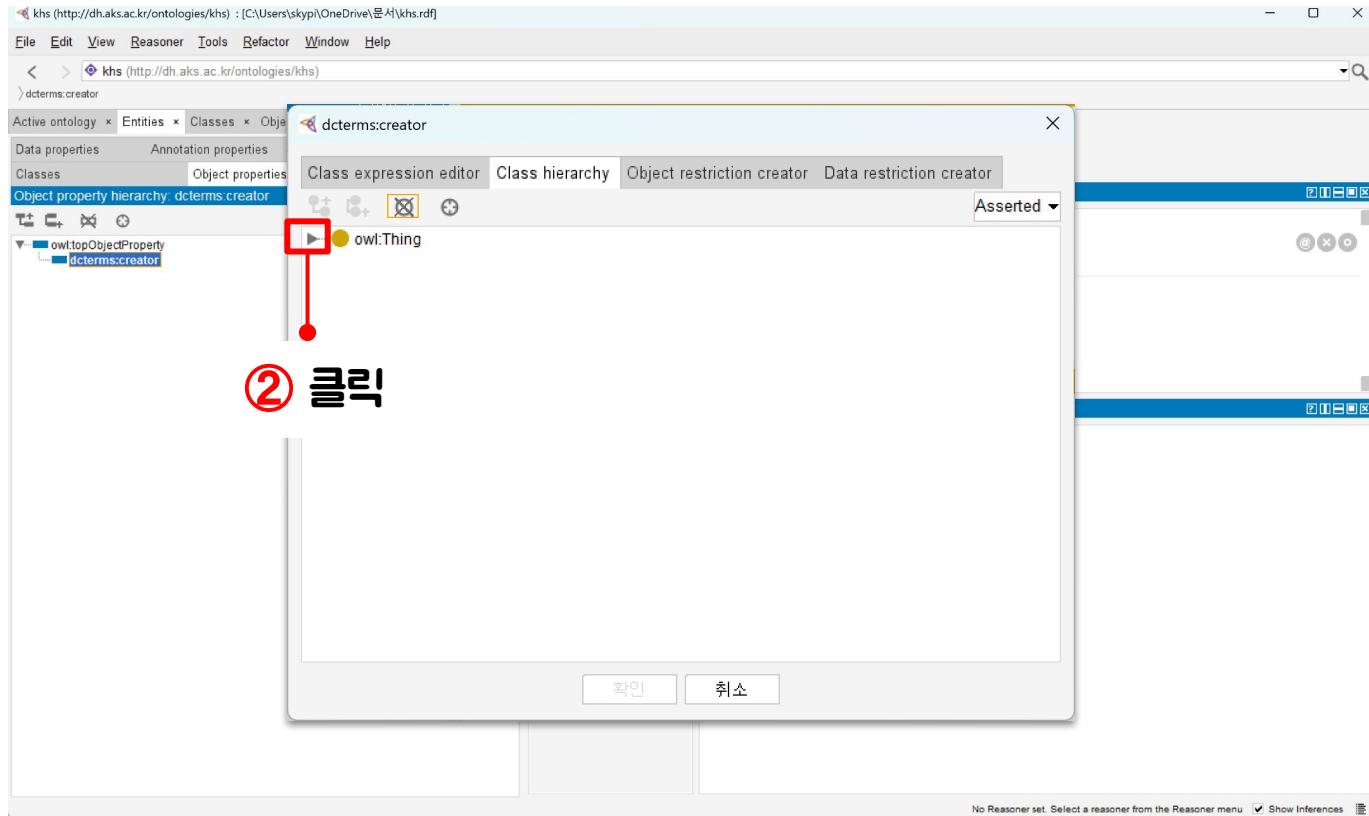
- Equivalent To
- SubProperty Of
- Inverse Of
- Domains (intersection)
- Ranges (intersection)
- Disjoint With
- SuperProperty Of (Chain)

At the bottom, a status bar says "No Reasoner set. Select a reasoner from the Reasoner menu" and "Show Inferences".

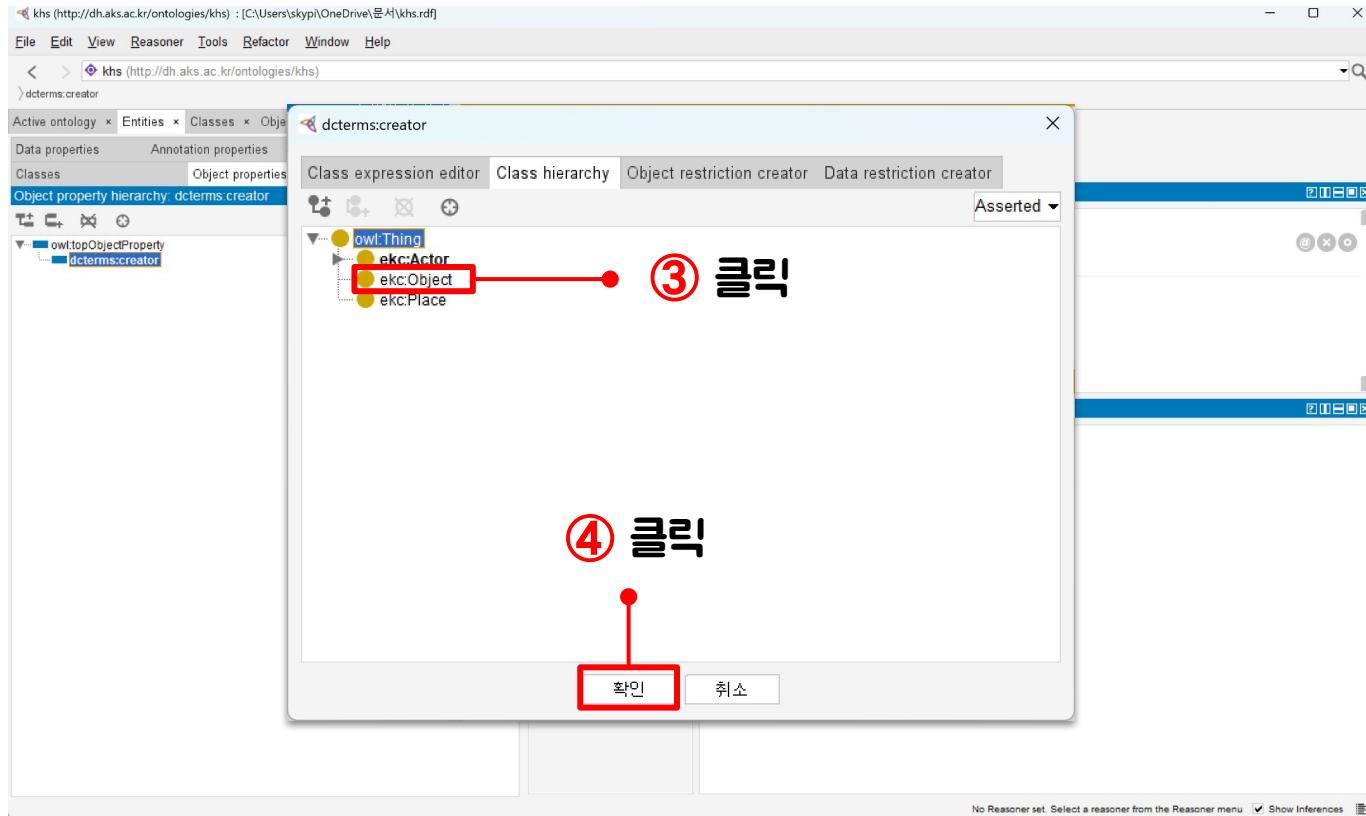
Object properties : Domain / Range 입력



Object properties : Domain / Range 입력



Object properties : Domain / Range 입력



Object properties : Domain / Range 입력

The screenshot shows the OntoGraf application interface for managing ontologies. The main window title is "khs (http://dh.aks.ac.kr/ontologies/khs) : [C:\Users\skyp\OneDrive\문서\khs.rdf]". The menu bar includes File, Edit, View, Reasoner, Tools, Refactor, Window, and Help. The toolbar has icons for back, forward, search, and other functions.

The navigation bar shows the active ontology "khs", entities, classes, object properties, data properties, annotation properties, individuals, and various tabs like Active ontology, Entities, Classes, Object properties, Data properties, Annotation properties, Individuals by class, OntoGraf, and SPARQL Query.

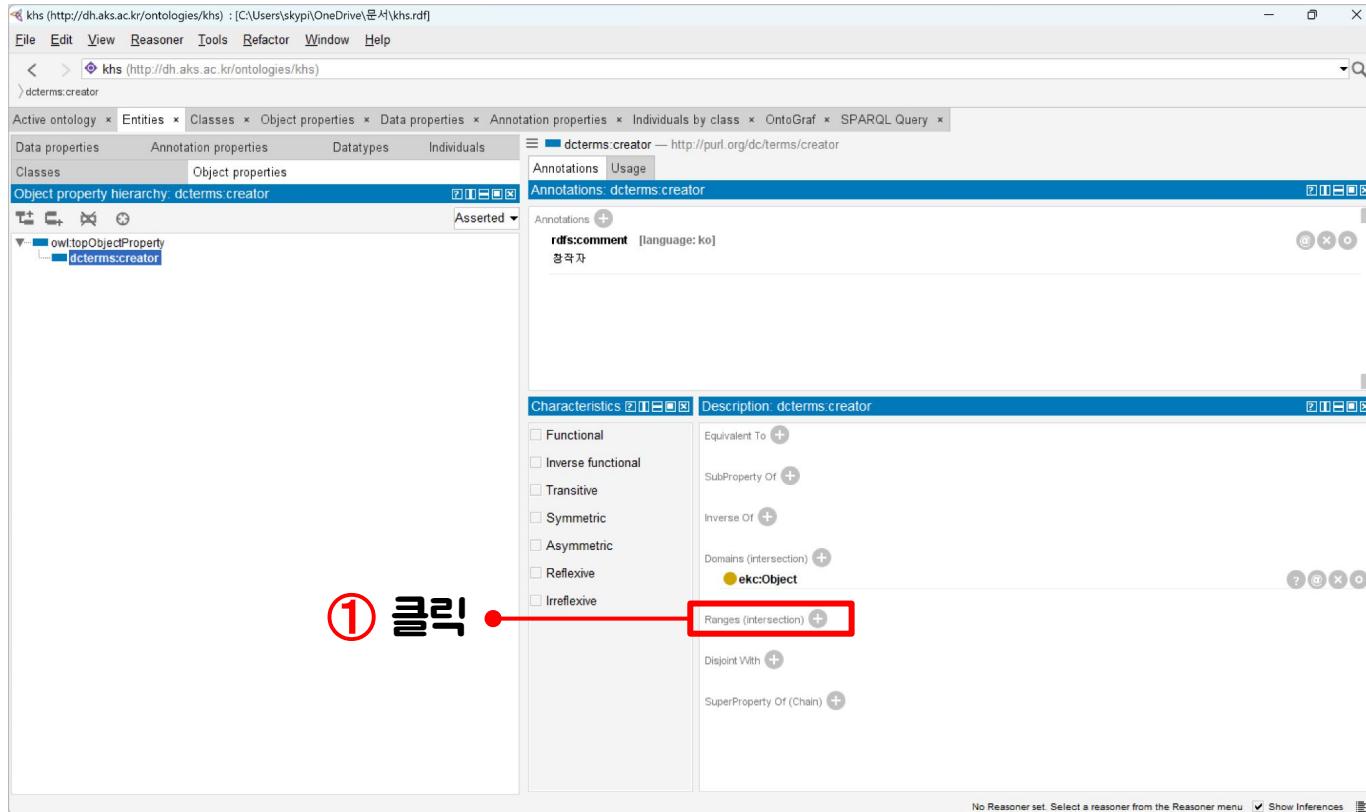
The left sidebar displays the "Object property hierarchy" for "dcterms:creator". It shows "owl:topObjectProperty" as the root, which branches into "dcterms:creator".

The central workspace is divided into several panes:

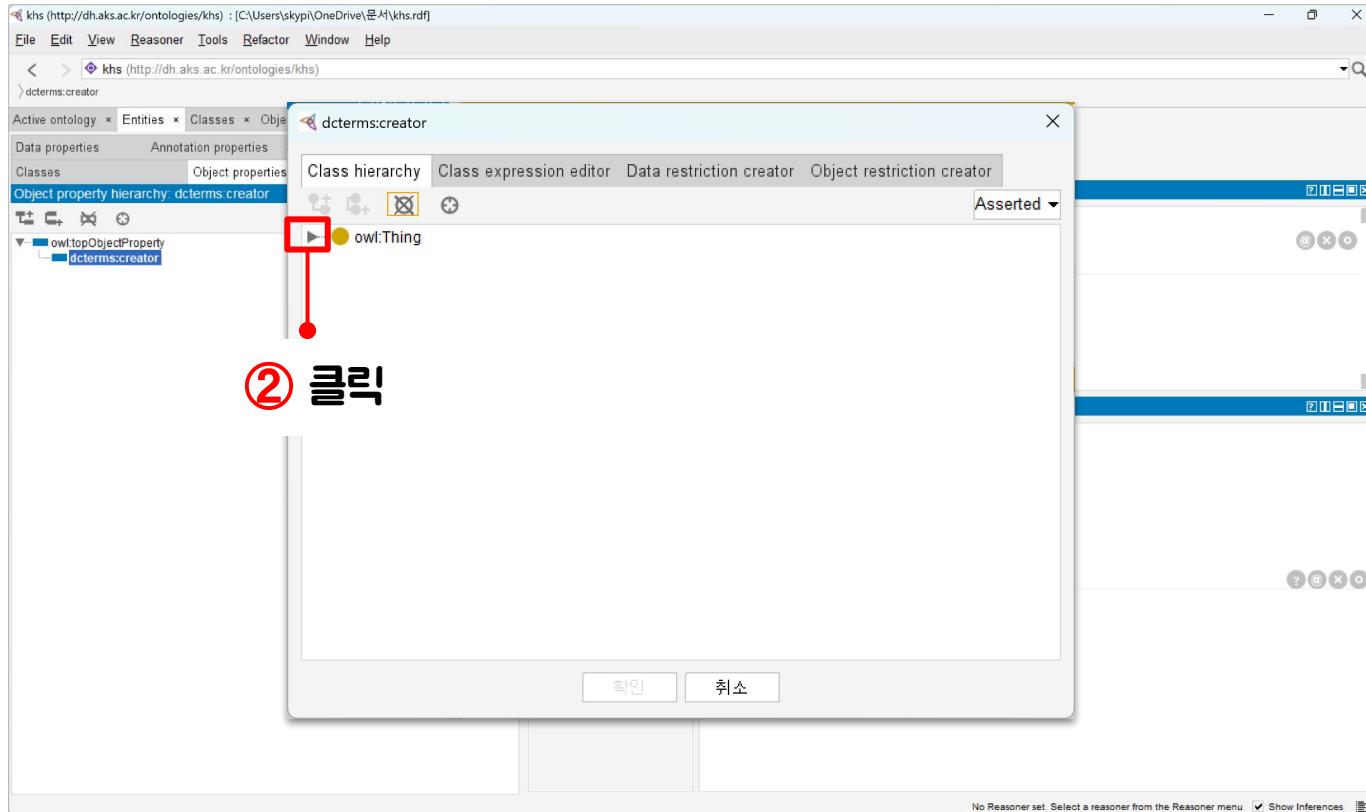
- Annotations:** Shows the annotation "rdfs:comment [language: ko]" with the value "창작자".
- Characteristics:** A list of property characteristics with checkboxes:
 - Functional
 - Inverse functional
 - Transitive
 - Symmetric
 - Asymmetric
 - Reflexive
 - Irreflexive
- Description: dcterms:creator:** A detailed view of the "dcterms:creator" property.
 - Domains (intersection):** Contains the term "ekc:Object", highlighted with a red rectangle.
 - Ranges (intersection):** Contains terms like "Disjoint With" and "SuperProperty Of (Chain)".
 - Relationships:** Includes "Equivalent To", "SubProperty Of", and "Inverse Of".

At the bottom of the interface, there is a message: "No Reasoner set. Select a reasoner from the Reasoner menu" with a checked checkbox, and a "Show Inferences" button.

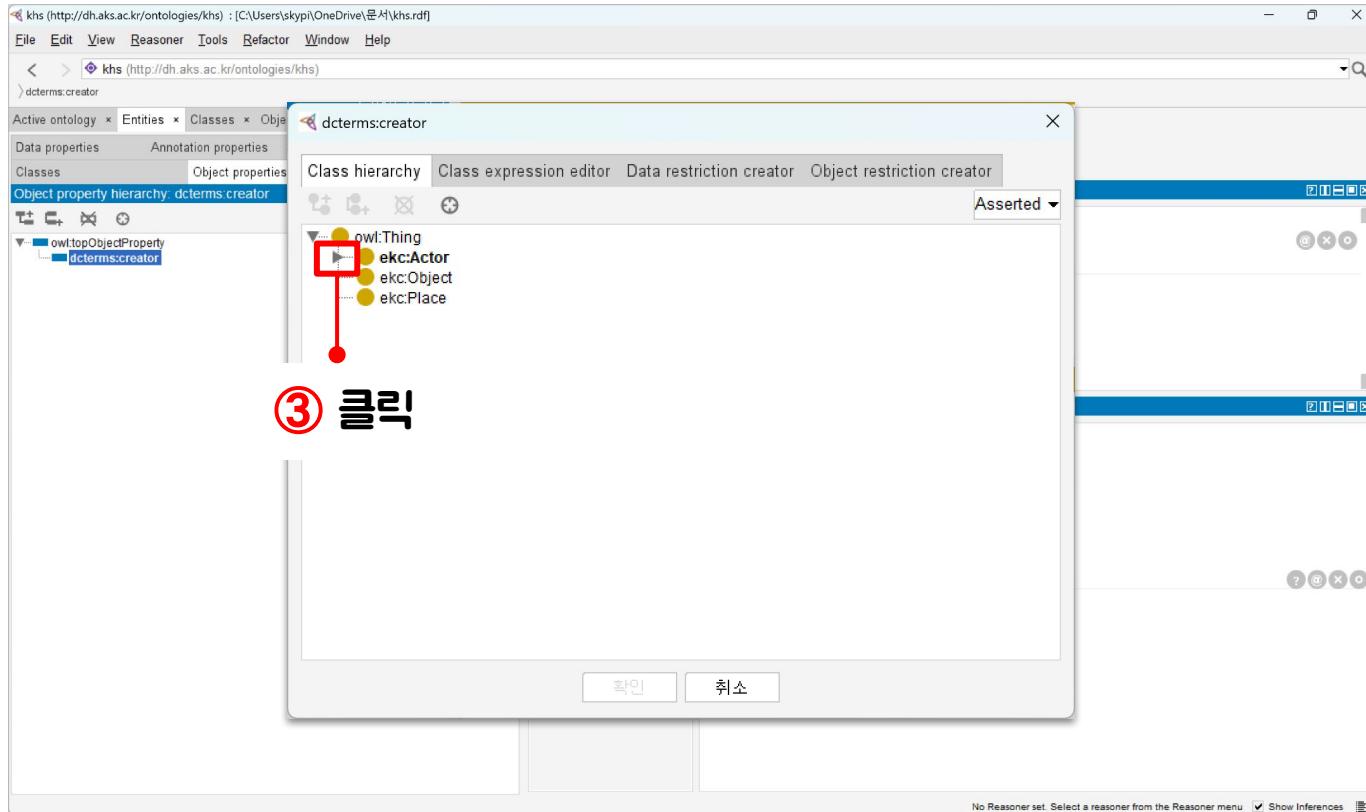
Object properties : Domain / Range 입력



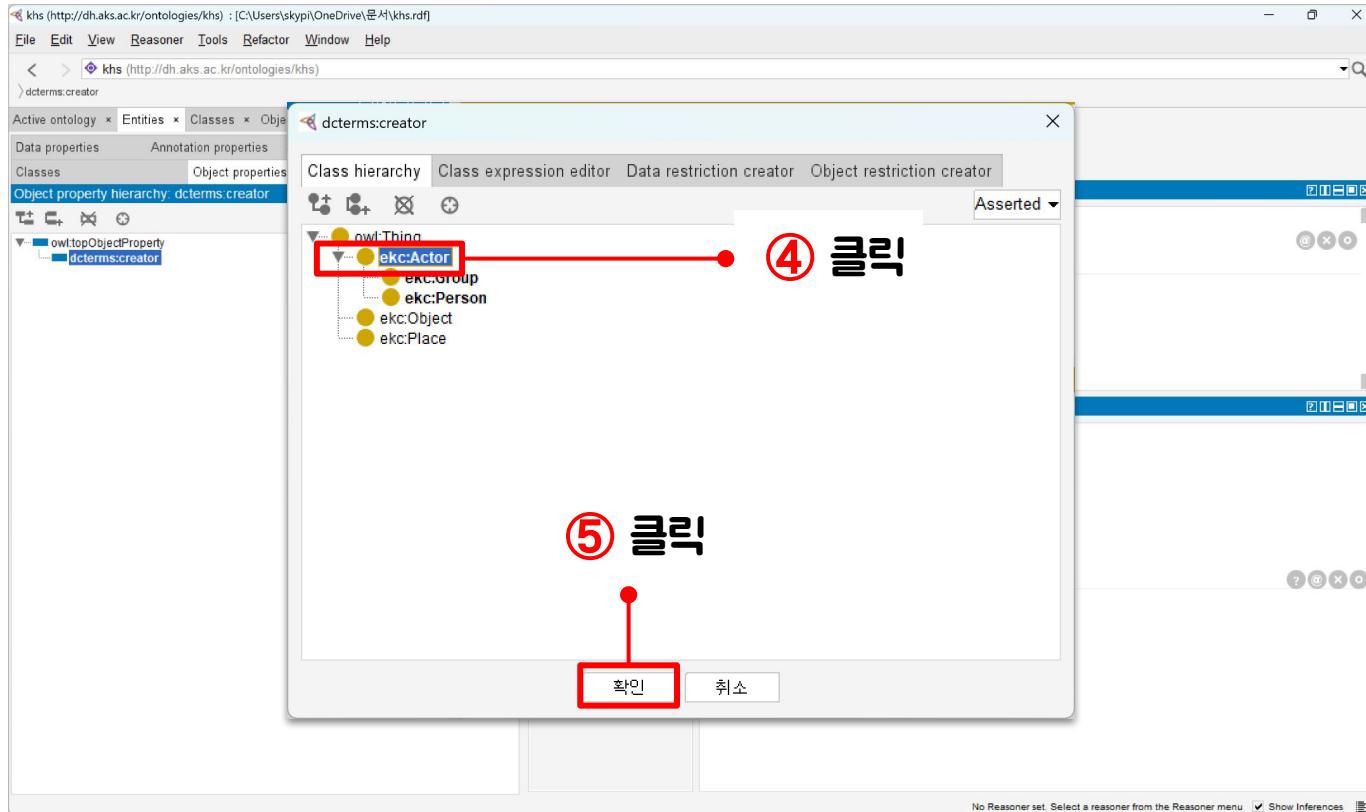
Object properties : Domain / Range 입력



Object properties : Domain / Range 입력



Object properties : Domain / Range 입력



Object properties : Domain / Range 입력

The screenshot shows the Protégé ontology editor interface. The top navigation bar includes File, Edit, View, Reasoner, Tools, Refactor, Window, and Help. The active ontology is 'khs' (http://dh.aks.ac.kr/ontologies/khs) located at [C:\Users\skyp\OneDrive\문서\khs.rdf]. The main menu tabs are Active ontology, Entities, Classes, Object properties, Data properties, Annotation properties, Datatypes, Individuals, Annotations, and Usage. The 'Object properties' tab is selected.

In the left sidebar, under 'Object property hierarchy: dcterms:creator', there is a tree view with 'owl:topObjectProperty' expanded, showing 'dcterms:creator' as a child node.

The 'Annotations' tab for 'dcterms:creator' displays the annotation 'rdfs:comment [language: ko]'. The text '창작자' is shown below the comment.

The 'Description' tab for 'dcterms:creator' lists the following characteristics:

- Functional
- Inverse functional
- Transitive
- Symmetric
- Asymmetric
- Reflexive
- Irreflexive

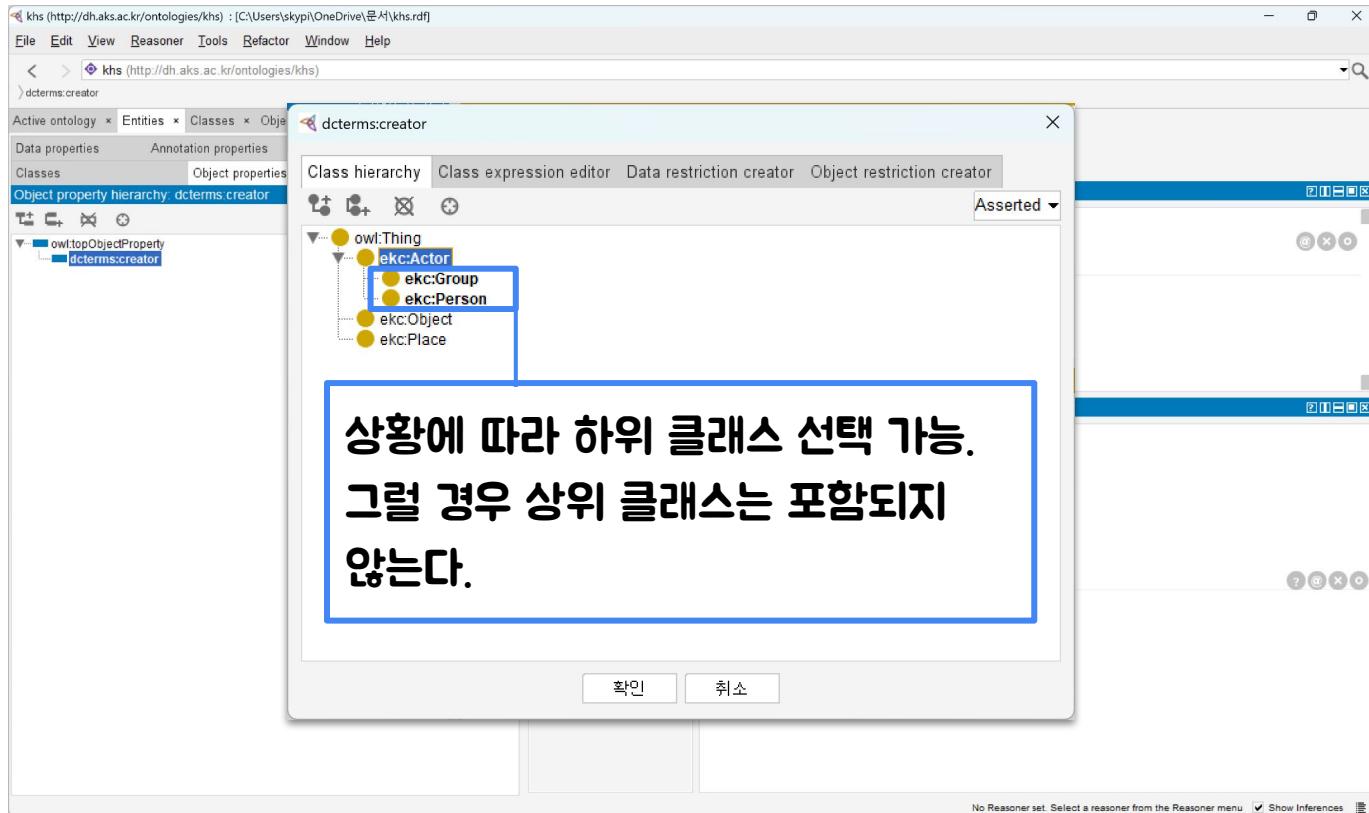
Below the characteristics, the 'Domains (intersection)' section shows 'ekc:Object'.

The 'Ranges (intersection)' section, which is highlighted with a red border, shows 'ekc:Actor'.

Other sections visible in the 'Description' tab include 'Equivalent To', 'SubProperty Of', 'Inverse Of', 'Disjoint With', and 'SuperProperty Of (Chain)'.

At the bottom of the interface, a message reads 'No Reasoner set. Select a reasoner from the Reasoner menu' with a checked checkbox for 'Show Inferences'.

※ Domain / Range 선택 시 주의



Object properties : 역관계 입력

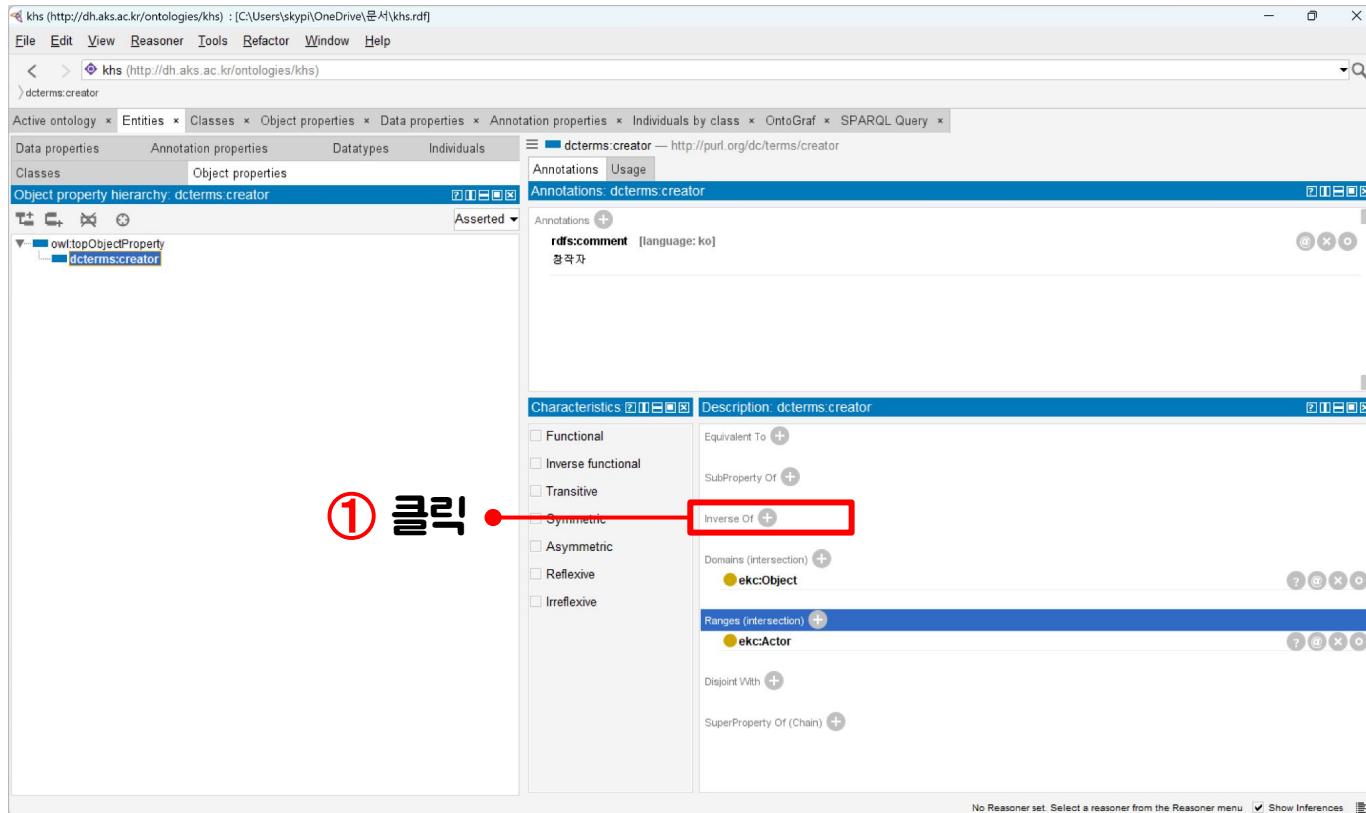
The screenshot shows the OntoGraf application interface for editing an ontology. The title bar indicates the active ontology is 'khs' located at 'C:\Users\skyp\OneDrive\문서\khs.rdf'. The menu bar includes File, Edit, View, Reasoner, Tools, Refactor, Window, and Help. The toolbar has icons for back, forward, search, and other functions.

The main window displays the 'Object properties' tab under the 'Active ontology' section. A navigation bar at the top of the content area includes tabs for Data properties, Annotation properties, Datatypes, Individuals, Classes, Object properties, and Object property hierarchy. The 'Object property hierarchy' dropdown shows 'owl:topObjectProperty' expanded to include 'dcterms:creator'.

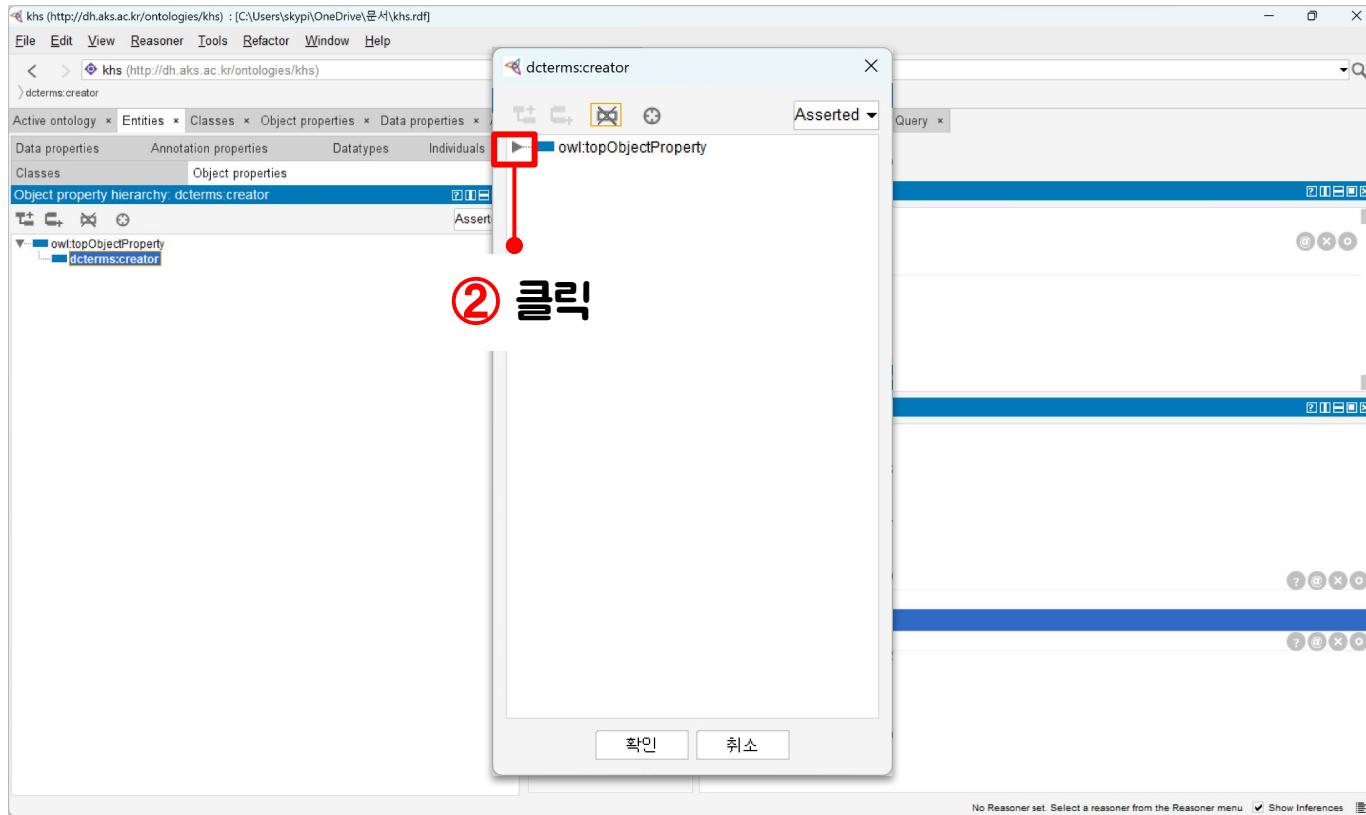
A central panel titled 'Annotations_dcterms.creator' lists an annotation: 'rdfs:comment [language: ko]'. Below this, a large orange rectangular box contains the Korean text: 'dcterms:creator 의 역관계를 만들고 싶다.' (I want to create an inverse relationship for dcterms:creator).

The bottom right panel shows various property types: Asymmetric, Reflexive, Irreflexive, Domains (intersection) with 'ekc:Object' selected, Ranges (intersection) with 'ekc:Actor' selected, Disjoint With, and SuperProperty Of (Chain). A status bar at the bottom right says 'No Reasoner set. Select a reasoner from the Reasoner menu'.

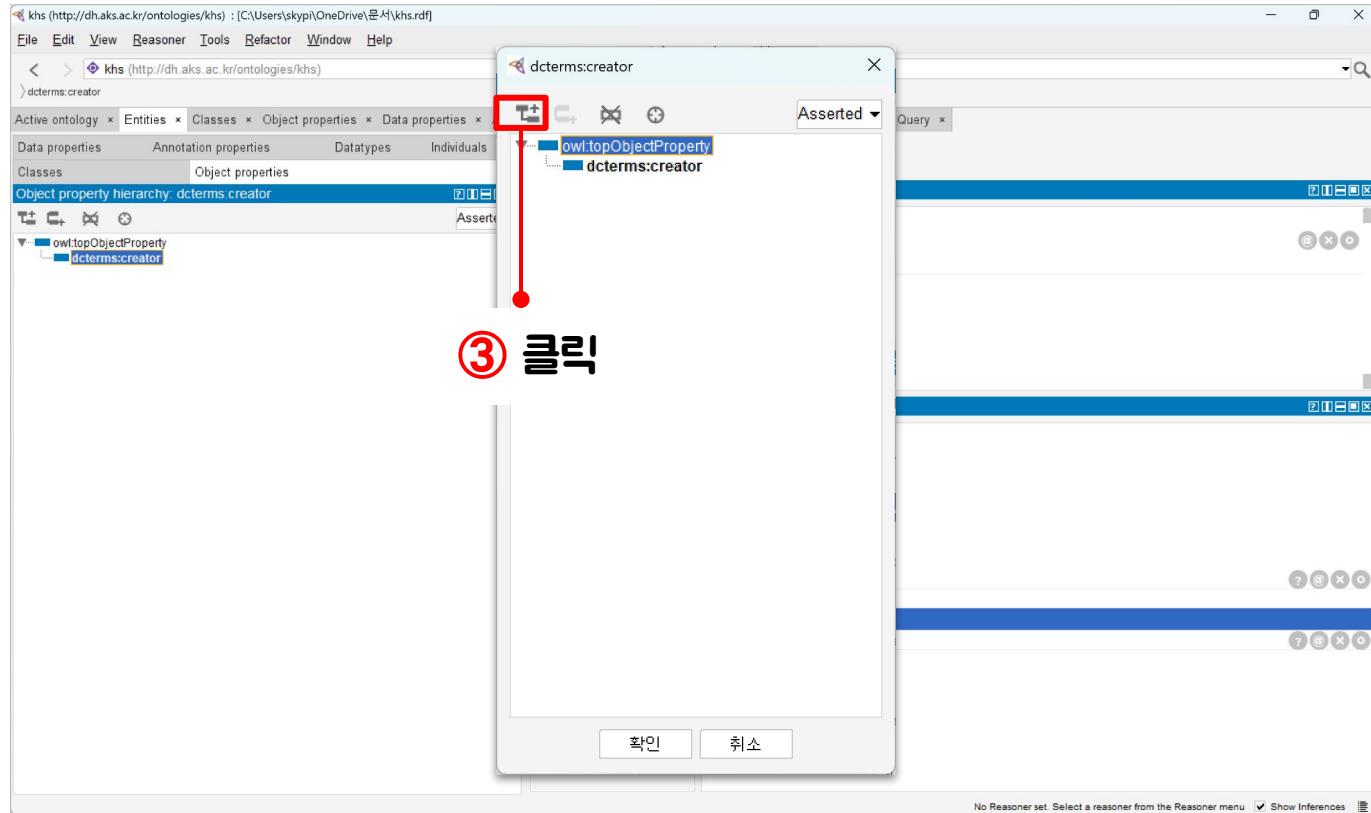
Object properties : 역관계 입력



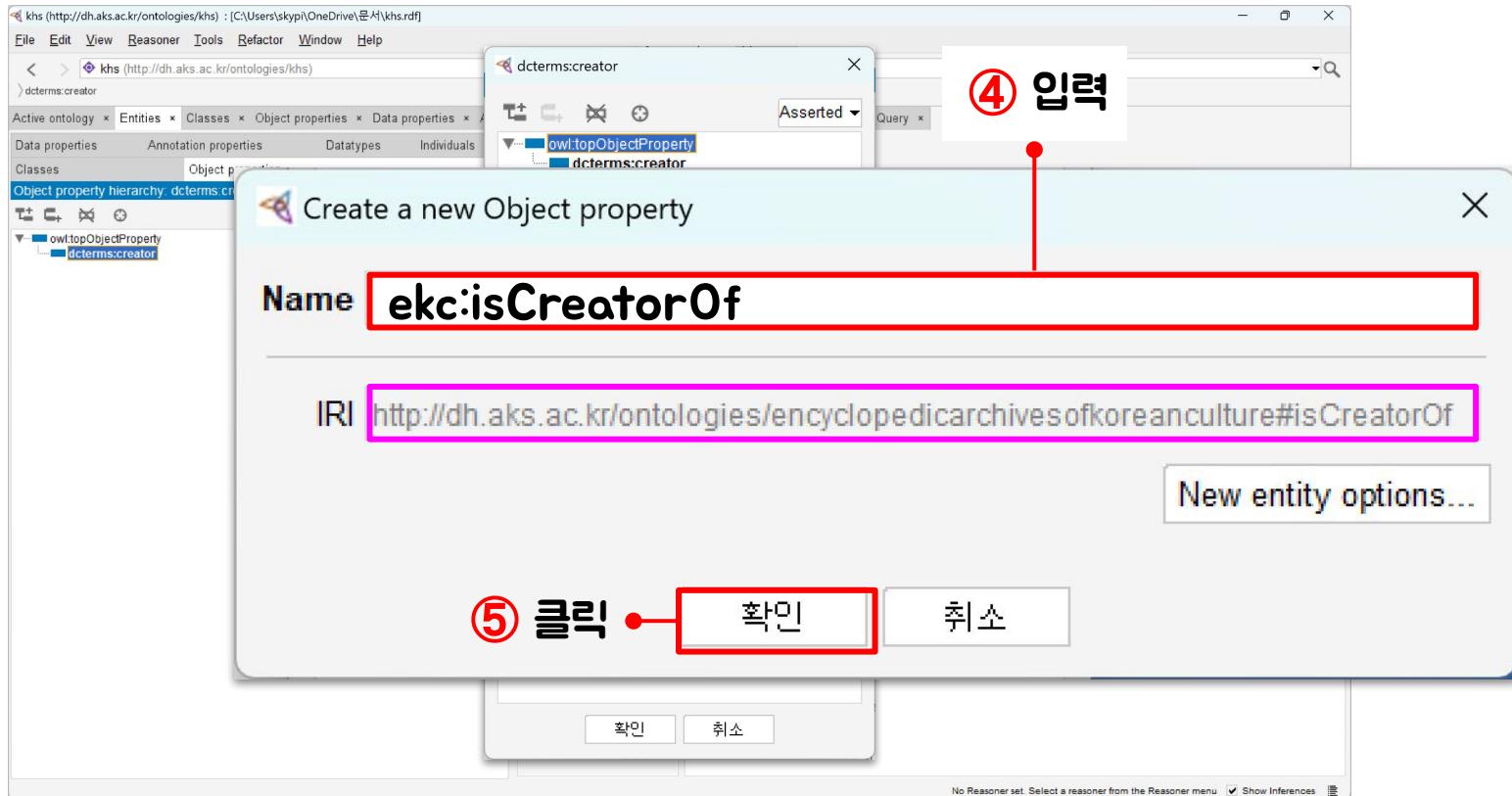
Object properties : 역관계 입력



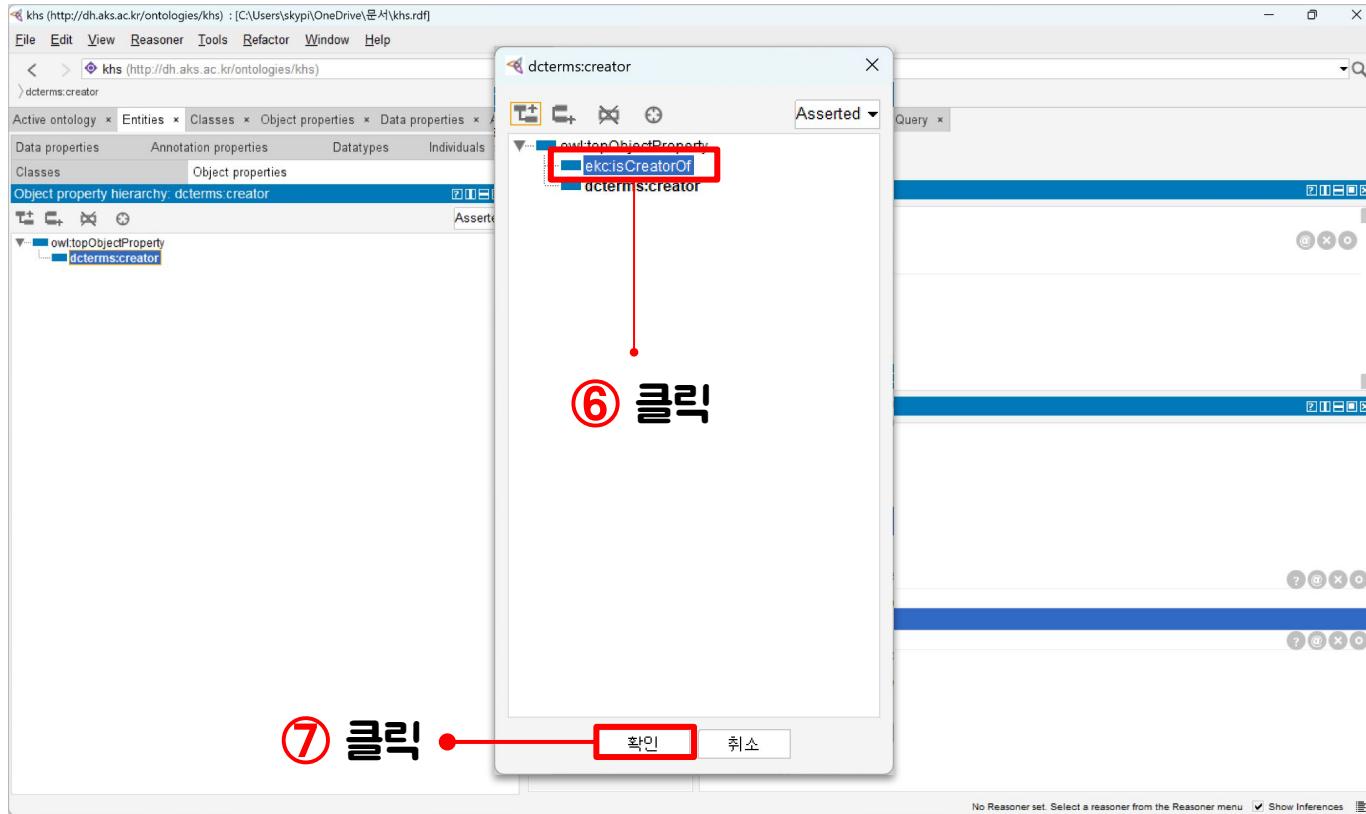
Object properties : 역관계 입력



Object properties : 역관계 입력



Object properties : 역관계 입력



Object properties : 역관계 입력

The screenshot shows the OntoGraf application interface for managing RDF ontologies. The main window title is "khs (http://dh.aks.ac.kr/ontologies/khs) : [C:\Users\skyp\OneDrive\문서\khs.rdf]". The menu bar includes File, Edit, View, Reasoner, Tools, Refactor, Window, and Help. The toolbar has icons for back, forward, search, and other operations.

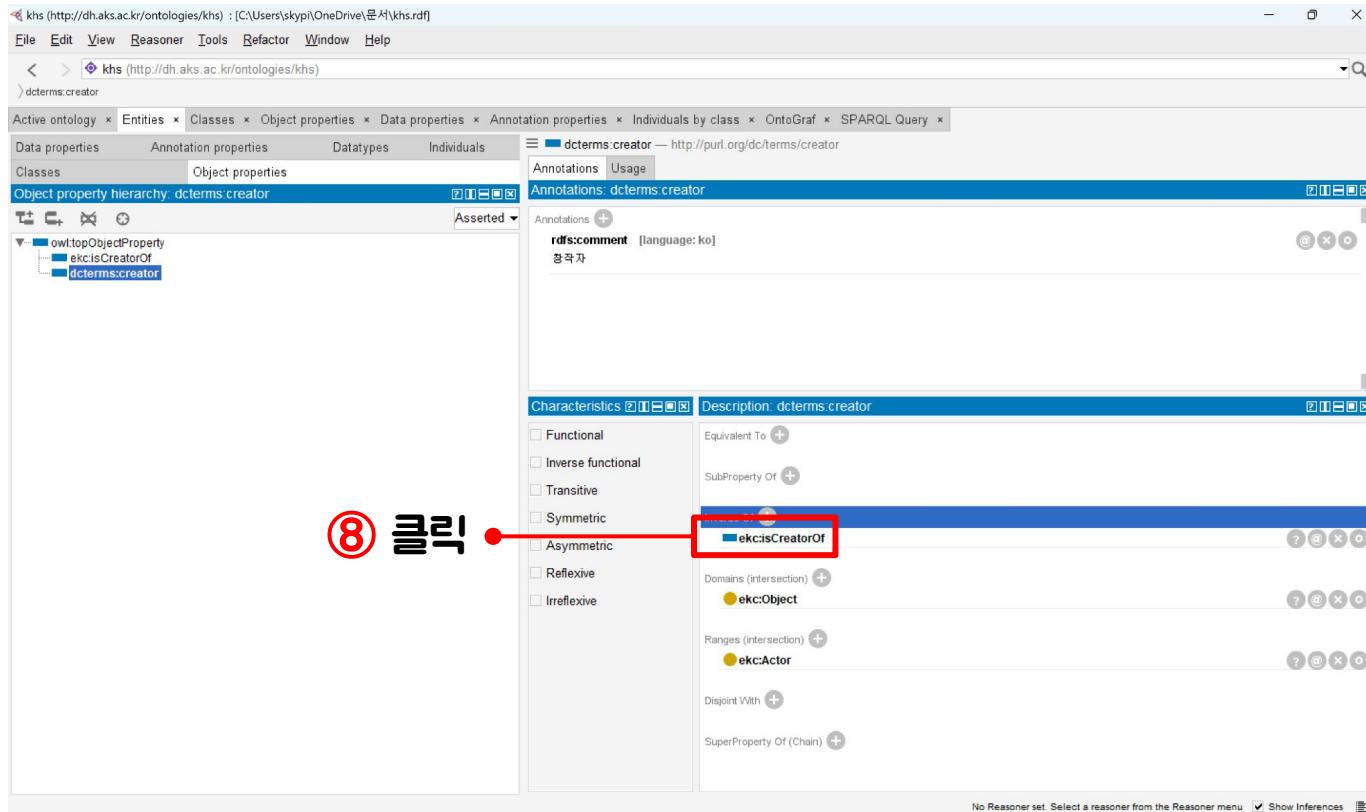
The navigation bar shows the current location: < > khs (http://dh.aks.ac.kr/ontologies/khs). The sidebar displays the "Object property hierarchy" for "dcterms:creator", listing "owl:topObjectProperty", "ekc:isCreatorOf", and "dcterms:creator".

The central workspace is divided into several panes:

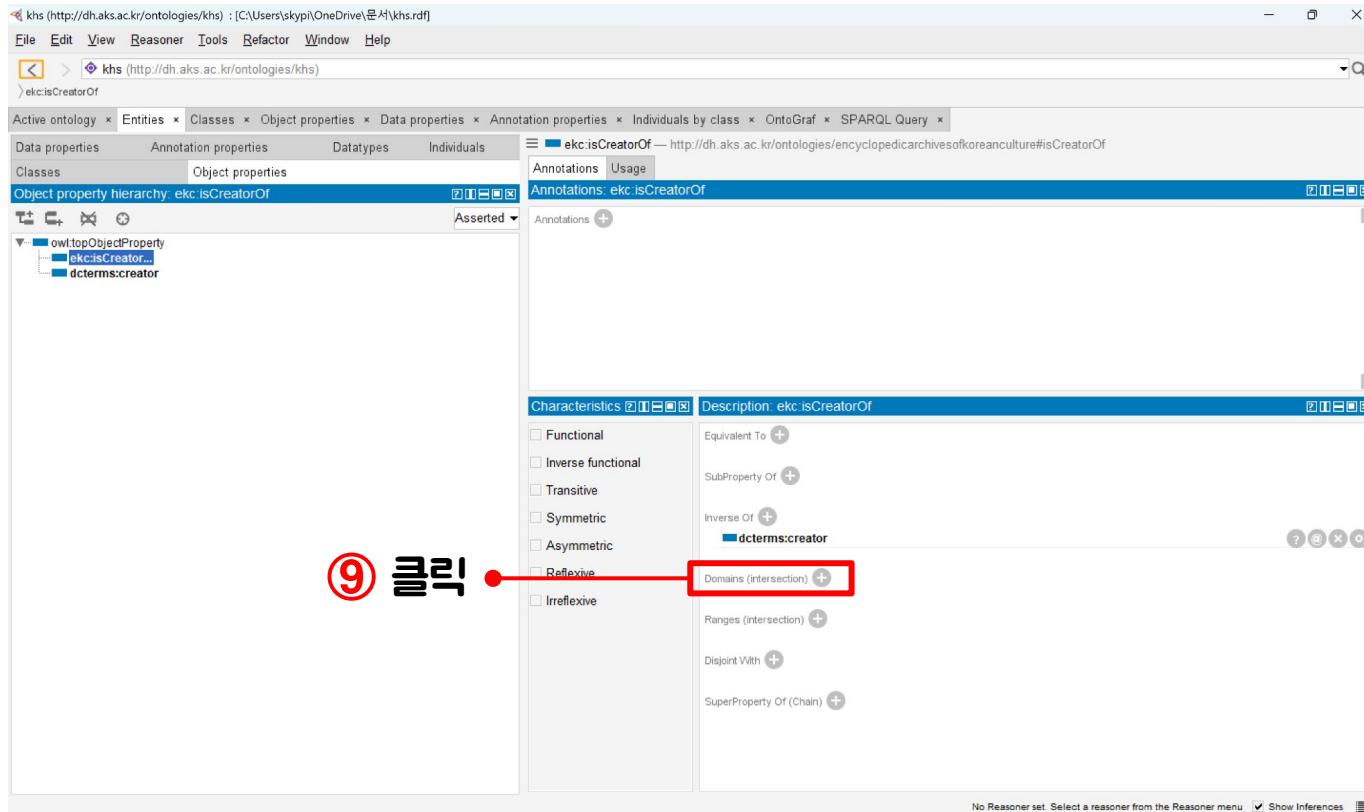
- Annotations:** Shows an annotation for "rdfs:comment" with the value "[language: ko] 흥작자".
- Characteristics:** A list of property characteristics: Functional, Inverse functional, Transitive, Symmetric, Asymmetric, Reflexive, Irreflexive. The "Functional" checkbox is checked.
- Description:** A panel titled "Description: dcterms:creator" containing:
 - Equivalent To: +
 - SubProperty Of: +
 - Inverse Of:** + (highlighted with a red box)
 - ekc:isCreatorOf
 - Domains (intersection): + (highlighted with a yellow dot)
 - ekc:Object
 - Ranges (intersection): + (highlighted with a yellow dot)
 - ekc:Actor
 - Disjoint With: +
 - SuperProperty Of (Chain): +

At the bottom of the interface, there is a status bar with the message "No Reasoner set. Select a reasoner from the Reasoner menu" and a "Show Inferences" checkbox.

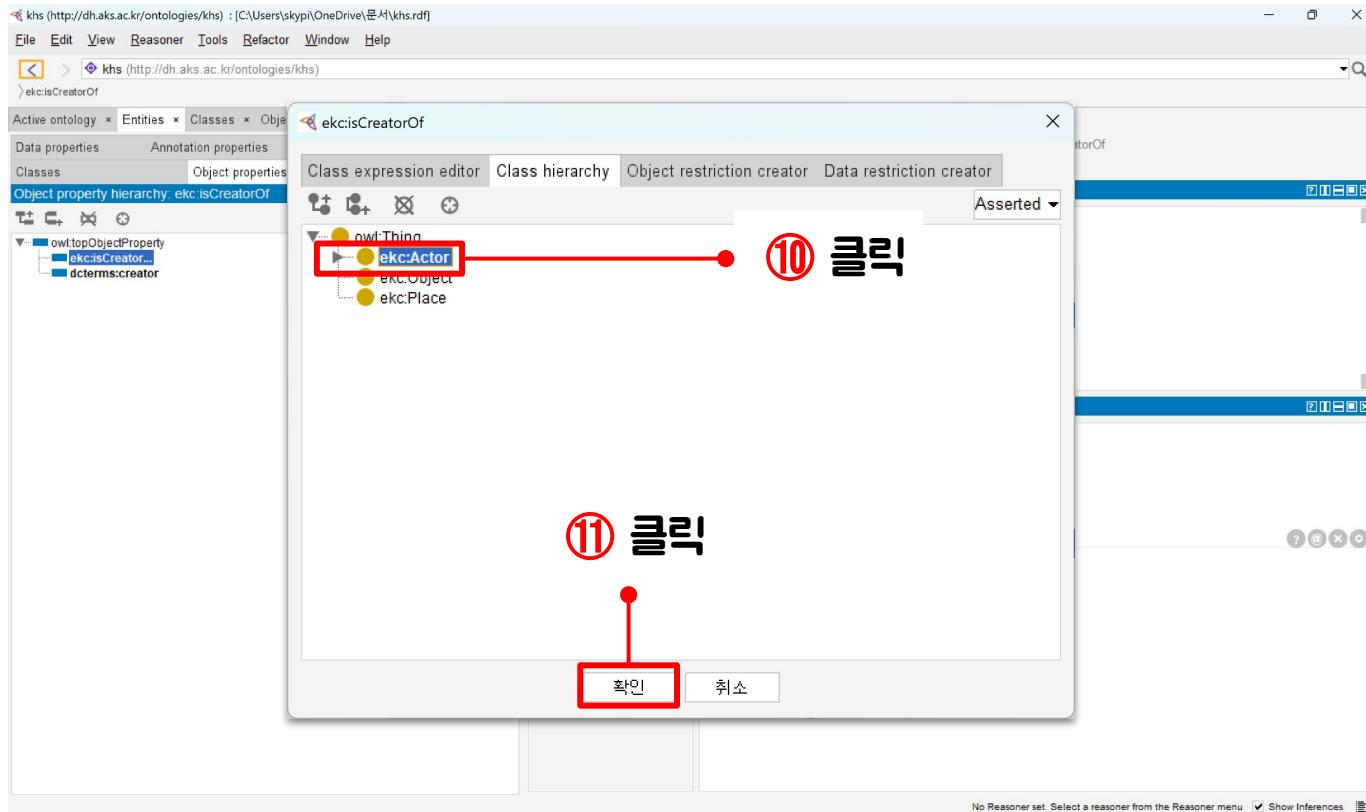
Object properties : 역관계 입력



Object properties : 역관계 입력



Object properties : 역관계 입력



Object properties : 역관계 입력

The screenshot shows the OntoGraf ontology editor interface. The top navigation bar includes File, Edit, View, Reasoner, Tools, Refactor, Window, and Help. The active tab is 'Object properties'. The left sidebar displays the 'Object property hierarchy' for 'ekc:isCreatorOf', which is a subproperty of 'owl:topObjectProperty'. Other subproperties listed are 'ekc:isCreator...' and 'dcterms:creator'. The main panel on the right shows the 'Annotations' tab for 'ekc:isCreatorOf'. A red box highlights the 'Domains (intersection)' section, which lists 'ekc:Actor' as a domain. Other sections include 'Characteristics', 'Description', 'Equivalent To', 'SubProperty Of', 'Inverse Of', 'Ranges (intersection)', 'Disjoint With', and 'SuperProperty Of (Chain)'. At the bottom, there is a note: 'No Reasoner set. Select a reasoner from the Reasoner menu'.

Object properties : 역관계 입력

The screenshot shows the OntoGraf application interface for editing an ontology. The main window title is "khs (http://dh.aks.ac.kr/ontologies/khs) : [C:\Users\skyp\OneDrive\문서\khs.rdf]". The menu bar includes File, Edit, View, Reasoner, Tools, Refactor, Window, and Help. The toolbar has icons for back, forward, search, and other operations.

The navigation bar shows the current location: > ekc:isCreatorOf. The tabs at the top are Active ontology, Entities, Classes, Object properties (which is selected), Data properties, Annotation properties, Datatypes, and Individuals.

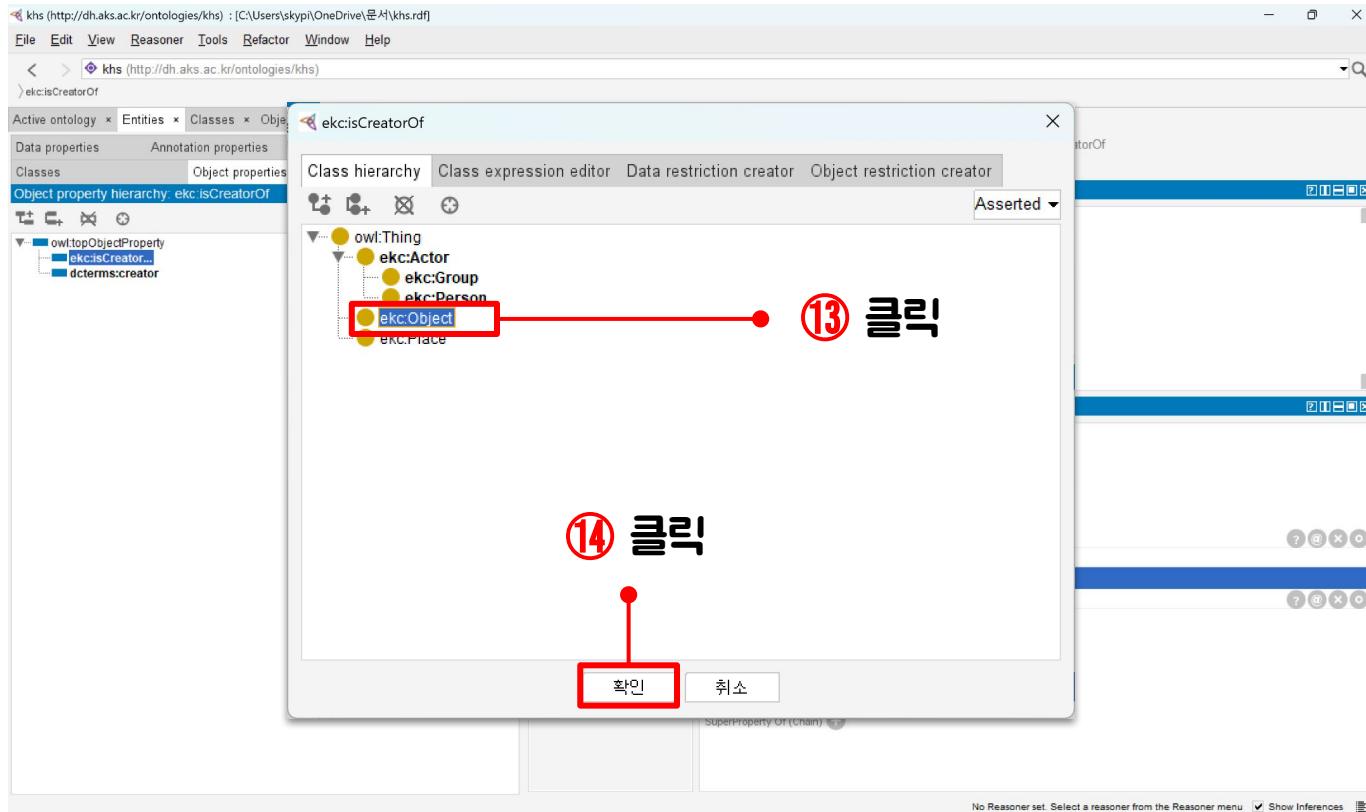
The left sidebar displays the "Object property hierarchy" for "ekc:isCreatorOf". It shows "owl:topObjectProperty" expanded, with "ekc:isCreator..." and "dcterms:creator" listed under it.

The right panel is titled "Annotations_ekc:isCreatorOf". It contains a table with columns for Annotations and Usage. The "Annotations" column has a "+" button to add annotations.

The bottom right panel is titled "Description: ekc:isCreatorOf". It lists characteristics: Functional, Inverse functional, Transitive, Symmetric, Asymmetric, Reflexive, and Irreflexive. The "Functional" checkbox is checked. Other characteristics like "Inverse Of" and "Domains (intersection)" are also present. A red circle with the number "12" and the Korean word "클릭" (click) points to the "Ranges (intersection)" button, which is highlighted with a red box.

At the bottom of the interface, there is a message: "No Reasoner set. Select a reasoner from the Reasoner menu" with a checked checkbox, and "Show Inferences" with a checked checkbox.

Object properties : 역관계 입력



Object properties : 역관계 입력

The screenshot shows the Protégé ontology editor interface. The top menu bar includes File, Edit, View, Reasoner, Tools, Refactor, Window, and Help. The title bar indicates the active ontology is "khs" located at "C:\Users\skyp\OneDrive\문서\khs.rdf". The main navigation tabs are Active ontology, Entities, Classes, Object properties, Data properties, Annotation properties, Datatypes, and Individuals. The "Object properties" tab is selected. A sub-tab "Annotations" is also visible. The left sidebar displays the "Object property hierarchy" for "ekc:isCreatorOf", showing it is a sub-property of "owl:topObjectProperty" and has three subclasses: "ekc:isCreatorOf", "dcterms:creator", and "dctypes:creator". The right panel shows the detailed characteristics and ranges for "ekc:isCreatorOf".

Characteristics:

- Functional
- Inverse functional
- Transitive
- Symmetric
- Asymmetric
- Reflexive
- Irreflexive

Description: ekc:isCreatorOf

- Equivalent To: +
- SubProperty Of: +
- Inverse Of: +
 - dcterms:creator
- Domains (intersection): +
 - ekc:Actor
- Ranges (intersection): +
 - ekc:Object
- Disjoint With: +
- SuperProperty Of (Chain): +

A red box highlights the "Ranges (intersection)" section, specifically the "ekc:Object" range.

Object properties : 관계 세분화

The screenshot shows the OntoGraf interface with the following details:

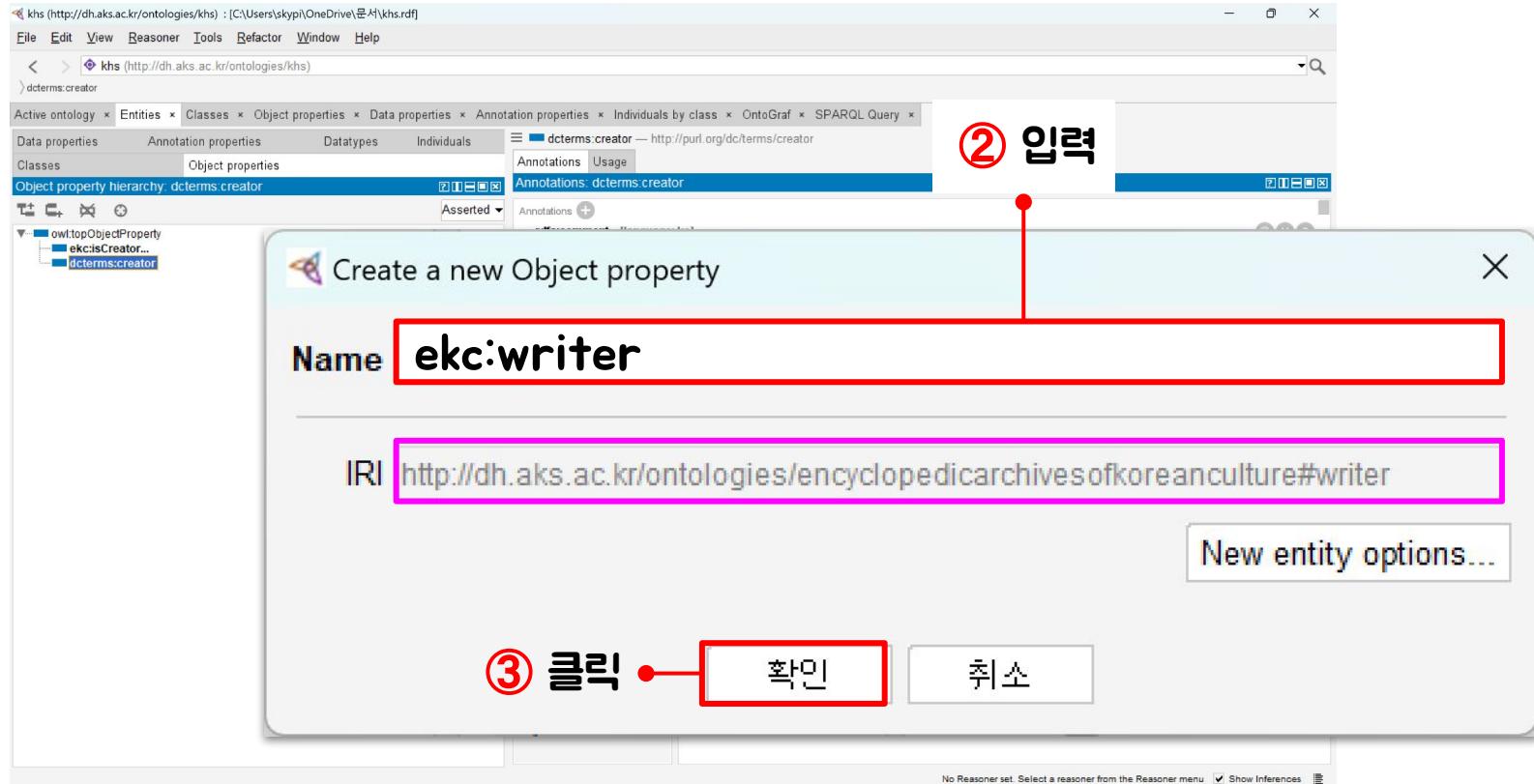
- File Bar:** File, Edit, View, Reasoner, Tools, Refactor, Window, Help.
- Title Bar:** khs (http://dh.aks.ac.kr/ontologies/khs) : [C:\Users\skyp\OneDrive\문서\khs.rdf]
- Toolbar:** Entities, Classes, Object properties, Data properties, Annotation properties, Individuals.
- Sub-Toolbar:** Active ontology, Entities, Classes, Object properties, Data properties, Annotation properties, Individuals by class, OntoGraf, SPARQL Query.
- Object Properties Tab:** Data properties, Annotation properties, Datatypes, Individuals, Object properties.
- Annotations Tab:** Annotations, Usage.
- Annotations Panel:** Annotations (+), rdfs:comment [language: ko] (창작자).
- Object Property Hierarchy:** dcTerms:creator → owl:topObjectProperty → ekc:isCreatorOf → dcTerms:creator.
- Properties Panel:** Asymmetric, Reflexive, Irreflexive, ekc:isCreatorOf (Domains: intersection: ekc:Object, Ranges: intersection: ekc:Actor, Disjoint With, SuperProperty Of (Chain)).
- Text Overlay:** 좀 더 세분화된 관계 설정을 하고 싶다. (Want to refine relationship settings further.)
- Bottom Status Bar:** No Reasoner set. Select a reasoner from the Reasoner menu. Show Inferences.

Object properties : 관계 세분화

① 클릭

The screenshot shows the OntoGraf application interface. The title bar indicates the active ontology is 'khs' located at 'C:\Users\skyp\OneDrive\문서\khs.rdf'. The menu bar includes File, Edit, View, Reasoner, Tools, Refactor, Window, and Help. The toolbar has icons for back, forward, search, and other functions. The main window has tabs for Active ontology, Entities, Classes, Object properties, Data properties, Annotation properties, Individuals by class, OntoGraf, and SPARQL Query. The 'Object properties' tab is selected. A sub-tab 'Annotations' is also selected. On the left, there is a tree view titled 'Object property hierarchy: dcterms:creator' under 'owl:topObjectProperty'. The tree includes nodes like 'ekc:isCreator...' and 'dcterms:creator'. A red circle and arrow point to the 'owl:topObjectProperty' node. The right side of the interface displays the 'Annotations' for 'dcterms:creator', showing a single annotation 'rdfs:comment [language: ko]'. Below this, the 'Characteristics' and 'Description' panels are shown for 'dcterms:creator'. The 'Characteristics' panel lists options like Functional, Inverse functional, Transitive, Symmetric, Asymmetric, Reflexive, and Irreflexive. The 'Description' panel shows relationships such as 'Equivalent To', 'SubProperty Of', 'Inverse Of' (linked to 'ekc:isCreatorOf'), 'Domains (intersection)' (linked to 'ekc:Object'), 'Ranges (intersection)' (linked to 'ekc:Actor'), 'Disjoint With', and 'SuperProperty Of (Chain)'. A status bar at the bottom says 'No Reasoner set. Select a reasoner from the Reasoner menu' and 'Show Inferences'.

Object properties : 관계 세분화



Object properties : 관계 세분화

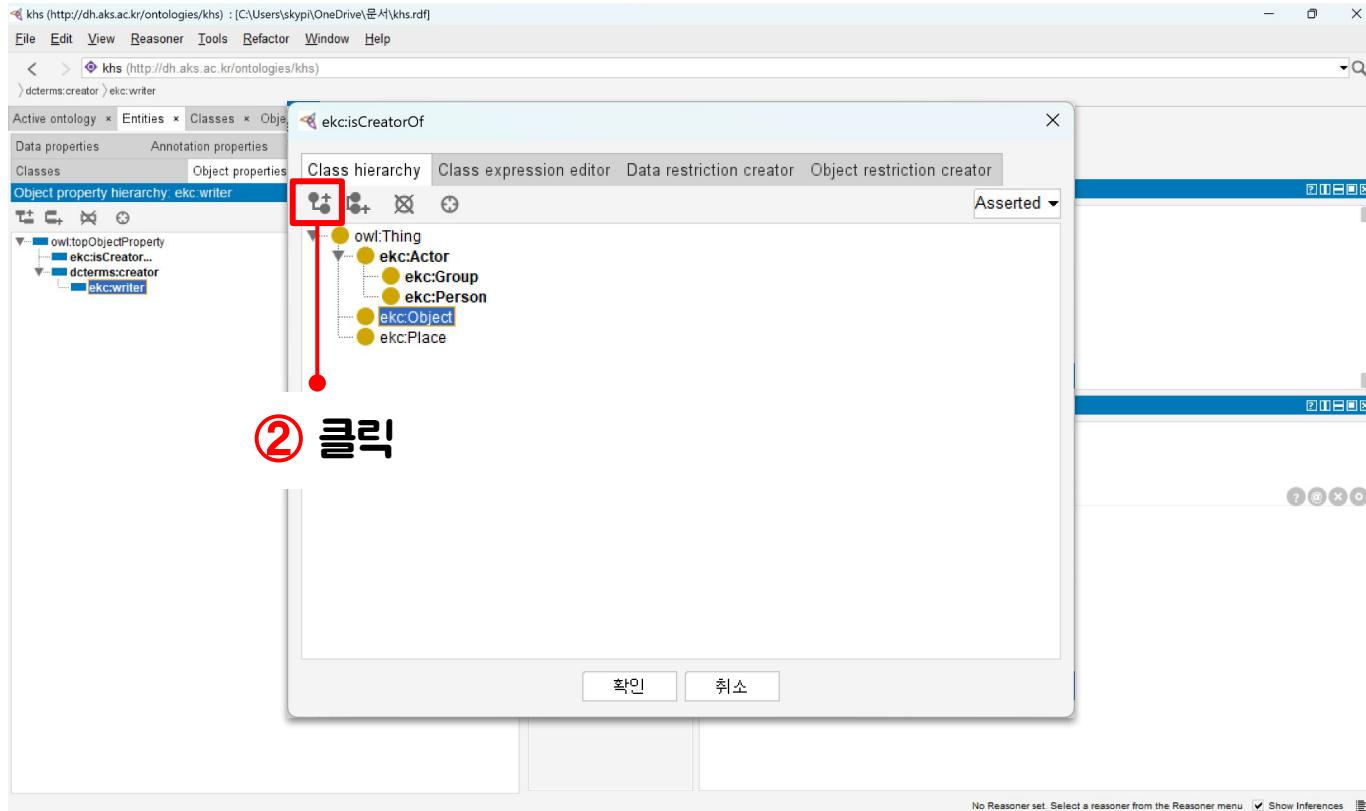
The screenshot shows the OntoGraf interface with the following details:

- Top Navigation:** File, Edit, View, Reasoner, Tools, Refactor, Window, Help.
- Breadcrumbs:** khs (http://dh.aks.ac.kr/ontologies/khs) > dcterms:creator.
- Active ontology:** Active ontology (highlighted in red).
- Tab Bar:** Entities, Classes, Object properties (highlighted in red), Data properties, Annotation properties, Individuals.
- Annotations Tab:** Annotations (highlighted in red), Usage.
- Object property hierarchy:** dcterms:creator
 - owl:topObjectProperty
 - ekc:isCreatorOf
 - dcterms:creator
 - ekc:writer
- Annotations:** rdfs:comment [language: ko] (English: Creator)
- Characteristics:** Functional, Inverse functional, Transitive, Symmetric, Asymmetric, Reflexive, Irreflexive.
- Description: dcterms:creator:**
 - Equivalent To: +
 - SubProperty Of: +
 - Inverse Of: +
 - ekc:isCreatorOf
 - Domains (intersection): +
 - ekc:Object
 - Ranges (intersection): +
 - ekc:Actor
 - Disjoint With: +
 - SuperProperty Of (Chain): +
- Status Bar:** No Reasoner set. Select a reasoner from the Reasoner menu. Show Inferences.

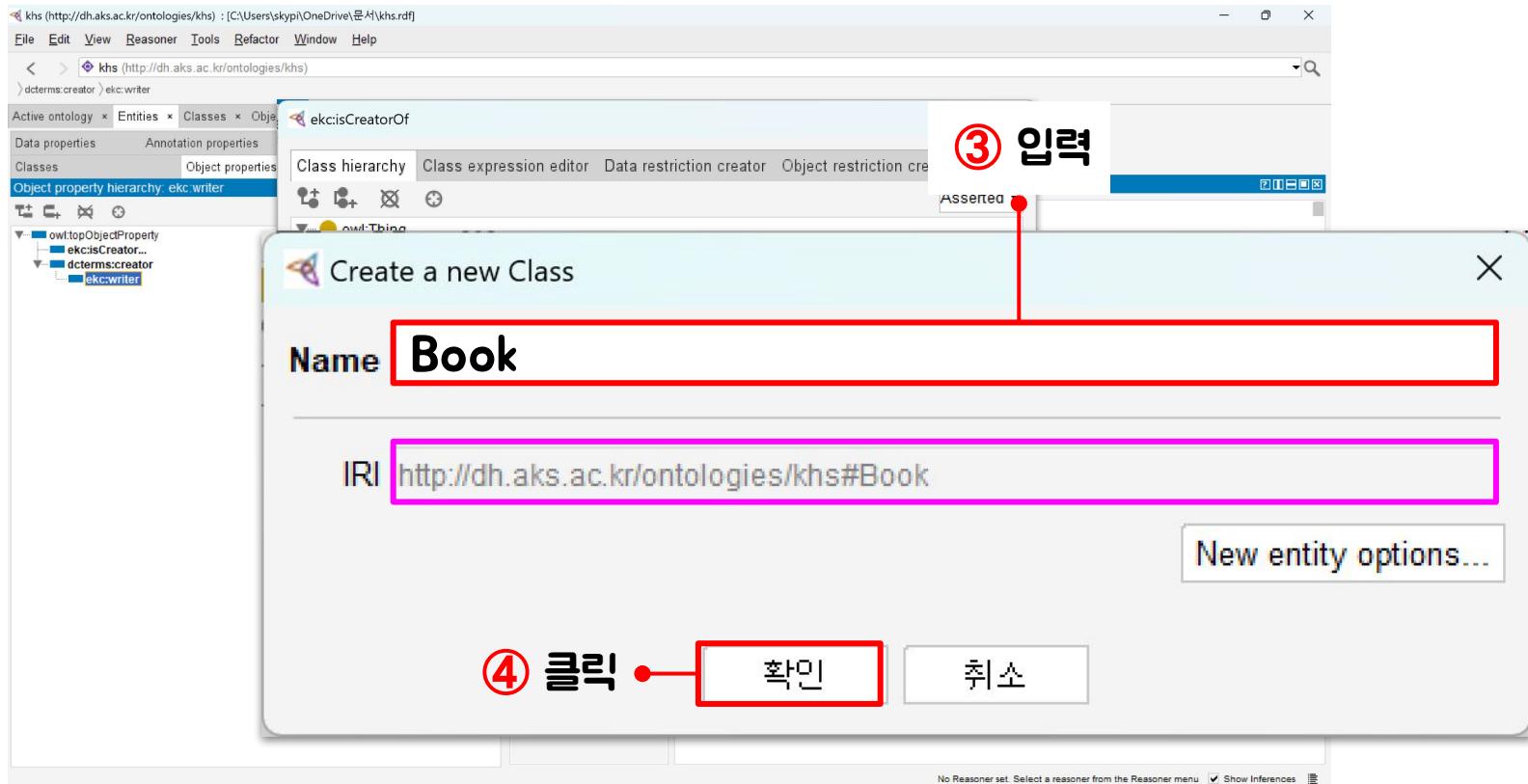
Object properties : 관계 세분화

The screenshot shows the Protégé ontology editor interface. The title bar indicates the active ontology is 'khs' located at 'C:\Users\skyp\OneDrive\문서\khs.rdf'. The menu bar includes File, Edit, View, Reasoner, Tools, Refactor, Window, and Help. The toolbar has icons for back, forward, search, and other functions. The main window has tabs for Active ontology, Entities, Classes, Object properties, Data properties, Annotation properties, Datatypes, and Individuals. The 'Object properties' tab is selected. A sub-tab 'Annotations' is also selected. On the left, the 'Object property hierarchy' for 'ekc:writer' is shown, with 'owl:topObjectProperty' expanded to show 'ekc:isCreator...' and 'dcterms:creator', which further expands to 'ekc:writer'. On the right, the 'Annotations' panel shows annotations for 'ekc:writer'. Below it, the 'Characteristics' panel lists various property types: Functional, Inverse functional, Transitive, Symmetric, Asymmetric, Reflexive (which is checked), and Irreflexive. The 'Description' panel for 'ekc:writer' lists relationships such as Equivalent To, SubProperty Of (with 'dcterms:creator'), Inverse Of, Domains (intersection), Ranges (intersection), Disjoint With, and SuperProperty Of (Chain). A red circle with the number '1' and the Korean text '클릭' (click) points to the 'Reflexive' checkbox in the characteristics panel.

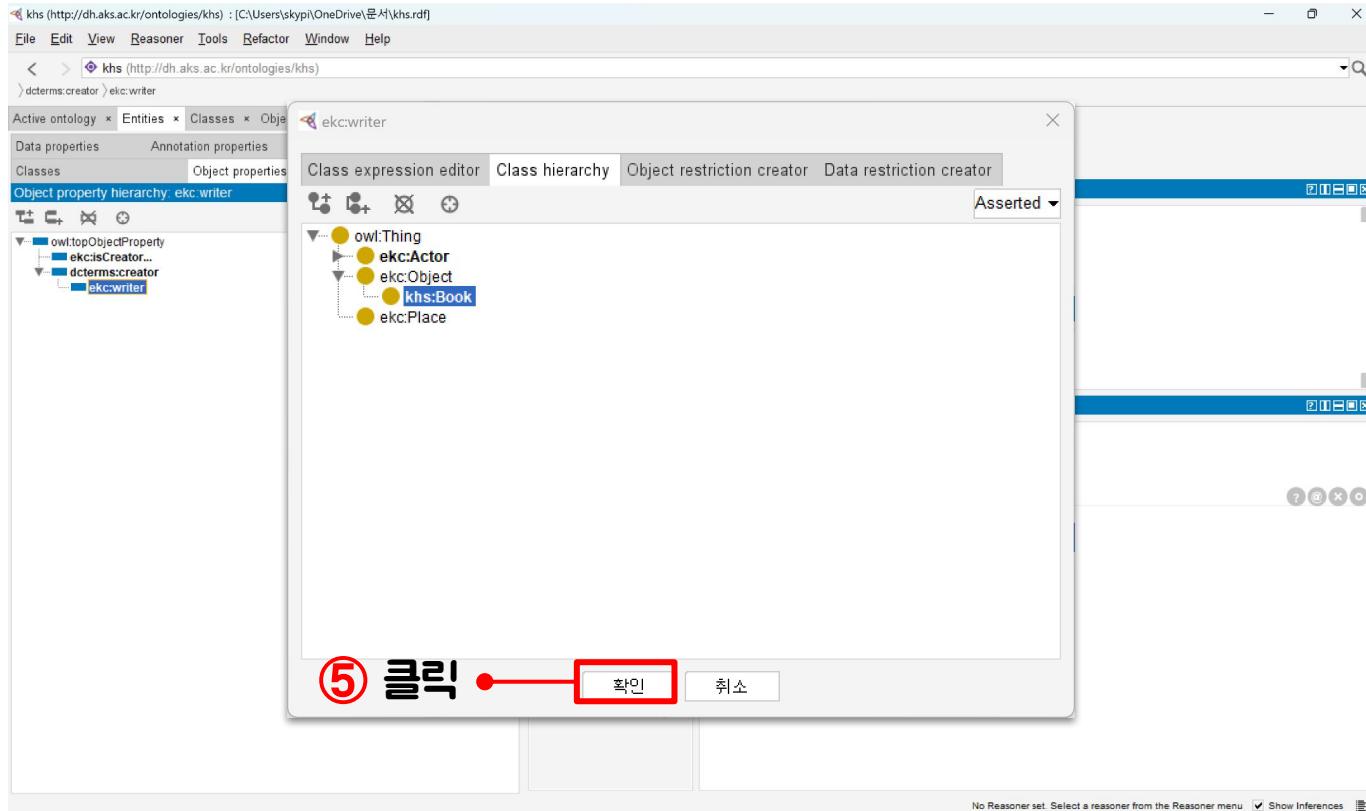
Object properties : 관계 세분화



Object properties : 관계 세분화



Object properties : 관계 세분화



Object properties : 관계 세분화

The screenshot shows the Protégé ontology editor interface. The top navigation bar includes File, Edit, View, Reasoner, Tools, Refactor, Window, and Help. The title bar indicates the active ontology is "khs" and the file path is "[C:\Users\skyp\OneDrive\문서\khs.rdf]".

The main menu tabs are Active ontology, Entities, Classes, Object properties, Data properties, Annotation properties, Datatypes, and Individuals. The "Object properties" tab is selected.

The left sidebar displays the "Object property hierarchy" for the "ekc:writer" property. It shows a tree structure with "owl:topObjectProperty" at the root, followed by "ekc:isCreator...", "dcterms:creator", and finally "ekc:writer".

The right panel shows the detailed description for the "ekc:writer" property. The "Characteristics" section includes options for Functional, Inverse functional, Transitive, Symmetric, Asymmetric, Reflexive, and Irreflexive. The "Description" section includes fields for Equivalent To, SubProperty Of (with a dropdown for "dcterms:creator"), Inverse Of, Domains (intersection), Ranges (intersection), Disjoint With, and SuperProperty Of (Chain). The "Domains (intersection)" field contains "khs:Book", which is highlighted with a red rectangle.

At the bottom of the interface, there is a message: "No Reasoner set. Select a reasoner from the Reasoner menu" with a checked checkbox for "Show Inferences".

Object properties : 관계 세분화

The screenshot shows the Protégé ontology editor interface. The title bar indicates the active ontology is 'khs' located at 'C:\Users\skyp\OneDrive\문서\khs.rdf'. The menu bar includes File, Edit, View, Reasoner, Tools, Refactor, Window, and Help. The toolbar has icons for back, forward, search, and other functions. The main window has tabs for Active ontology, Entities, Classes, Object properties, Data properties, Annotation properties, Datatypes, and Individuals. The 'Object properties' tab is selected. A sub-tab 'Annotations' is also selected. On the left, the 'Object property hierarchy' for 'ekc:writer' is shown, with 'owl:topObjectProperty' expanded to show 'ekc:isCreator...' and 'dcterms:creator', which further expands to 'ekc:writer'. On the right, the 'Annotations' panel for 'ekc:writer' is displayed, showing its characteristics and descriptions. A red circle with the number '1' and the Korean word '클릭' (click) with a red arrow points to the 'Ranges (intersection)' button in the 'Domains (intersection)' section of the annotations panel.

① 클릭

Annotations: ekc:writer

Characteristics

- Functional
- Inverse functional
- Transitive
- Symmetric
- Asymmetric
- Reflexive
- Irreflexive

Description: ekc.writer

Equivalent To +

SubProperty Of +
dcterms:creator

Inverse Of +

Domains (intersection) +
khs:Book

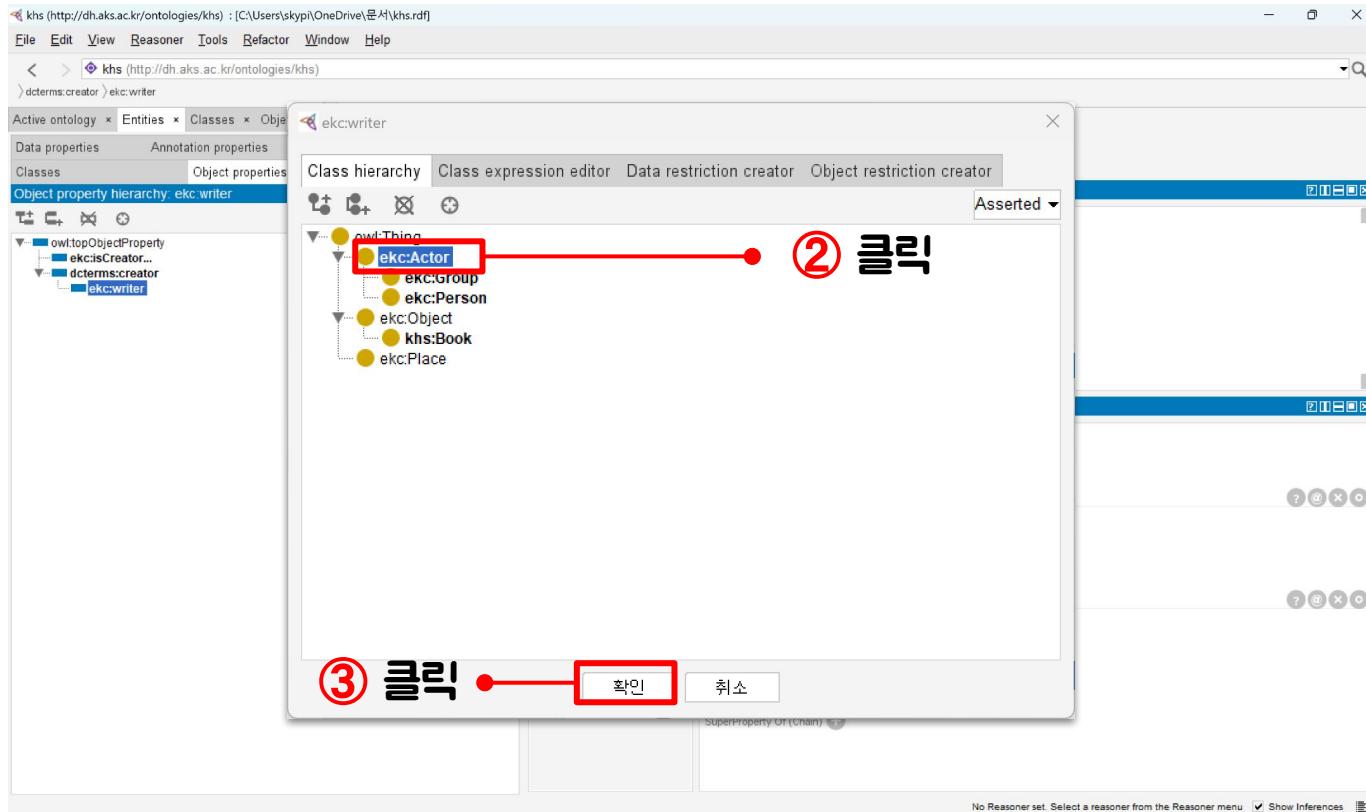
Ranges (intersection) +

Disjoint With +

SuperProperty Of (Chain) +

No Reasoner set. Select a reasoner from the Reasoner menu Show Inferences

Object properties : 관계 세분화



Object properties : 관계 세분화

The screenshot shows the Protégé ontology editor interface. The title bar indicates the active ontology is 'khs' located at 'C:\Users\skyp\OneDrive\문서\khs.rdf'. The menu bar includes File, Edit, View, Reasoner, Tools, Refactor, Window, and Help.

The main navigation bar has tabs for Active ontology, Entities, Classes, Object properties, Data properties, Annotation properties, Datatypes, and Individuals. The 'Object properties' tab is selected.

The left sidebar displays the 'Object property hierarchy' for 'ekc:writer'. It shows 'owl:topObjectProperty' as the root, with 'ekc:isCreator...' and 'dcterms:creator' as children, and 'ekc:writer' as a child of 'dcterms:creator'.

The right panel shows the detailed description for 'ekc:writer'. The 'Characteristics' section lists: Functional, Inverse functional, Transitive, Symmetric, Asymmetric, Reflexive, and Irreflexive. The 'Description' section includes:

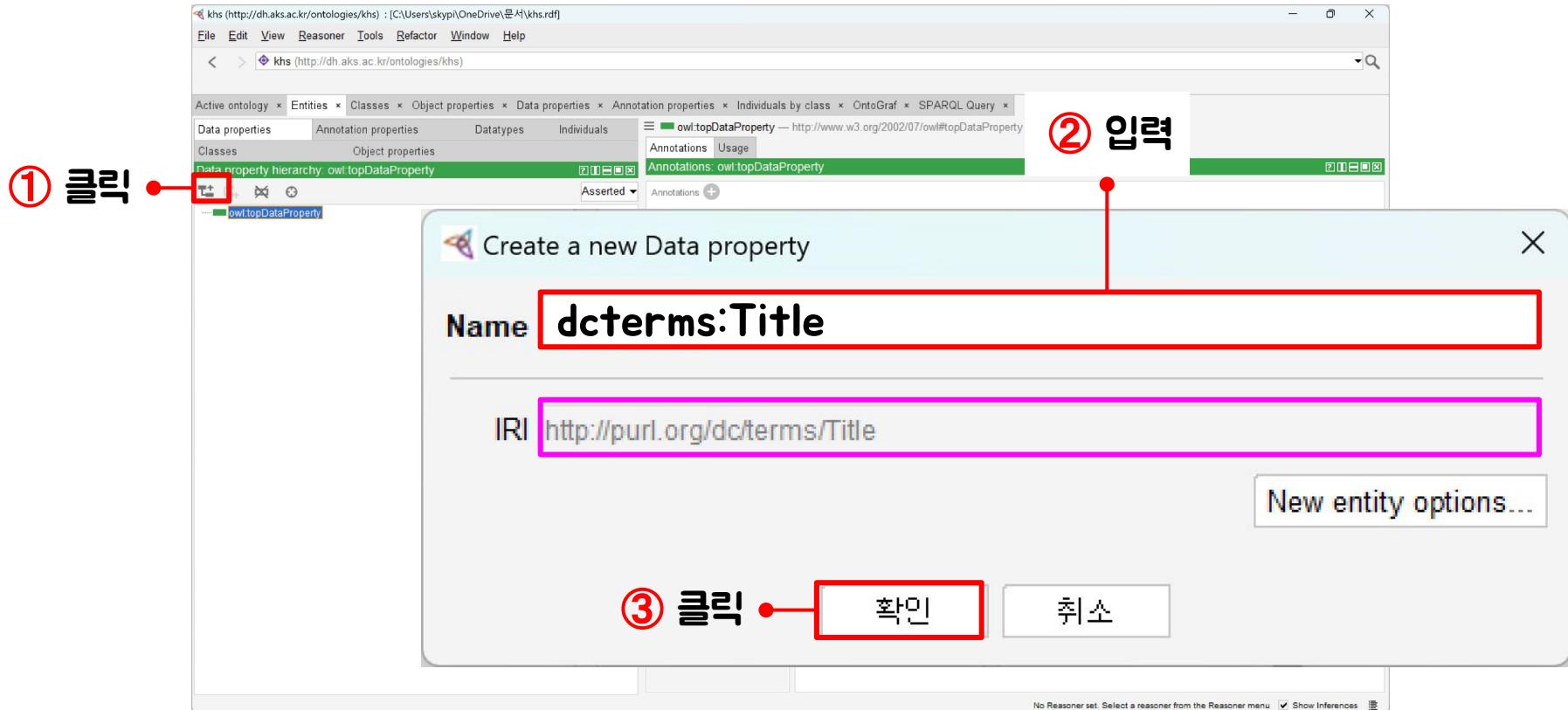
- Equivalent To: +
- SubProperty Of: +
 - dcterms:creator
- Inverse Of: +
- Domains (intersection): +
 - khs:Book
- Ranges (intersection): +
 - ekc:Actor
- Disjoint With: +
- SuperProperty Of (Chain): +

At the bottom of the interface, there is a message: 'No Reasoner set. Select a reasoner from the Reasoner menu' with a checked checkbox for 'Show Inferences'.

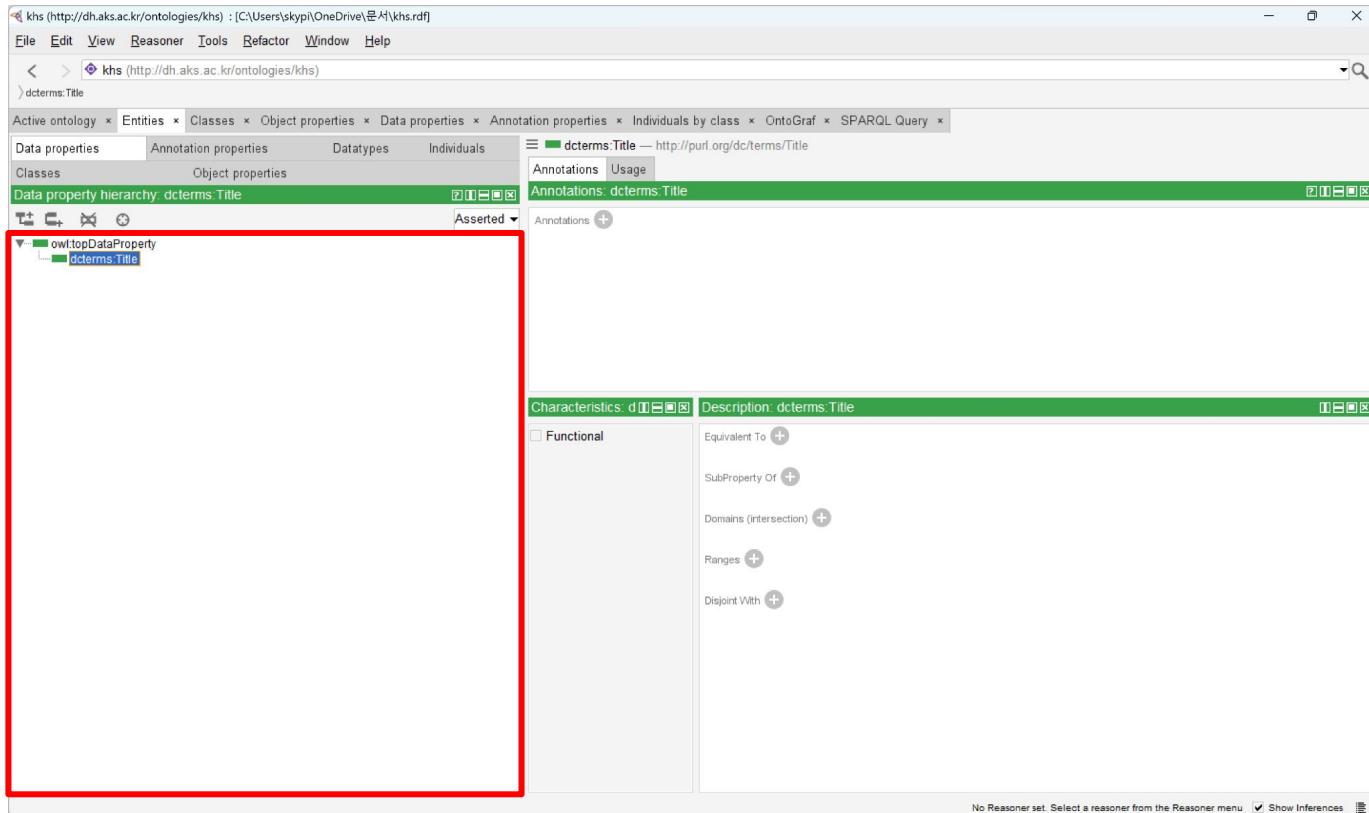
6

프로테제 실습 - Data properties

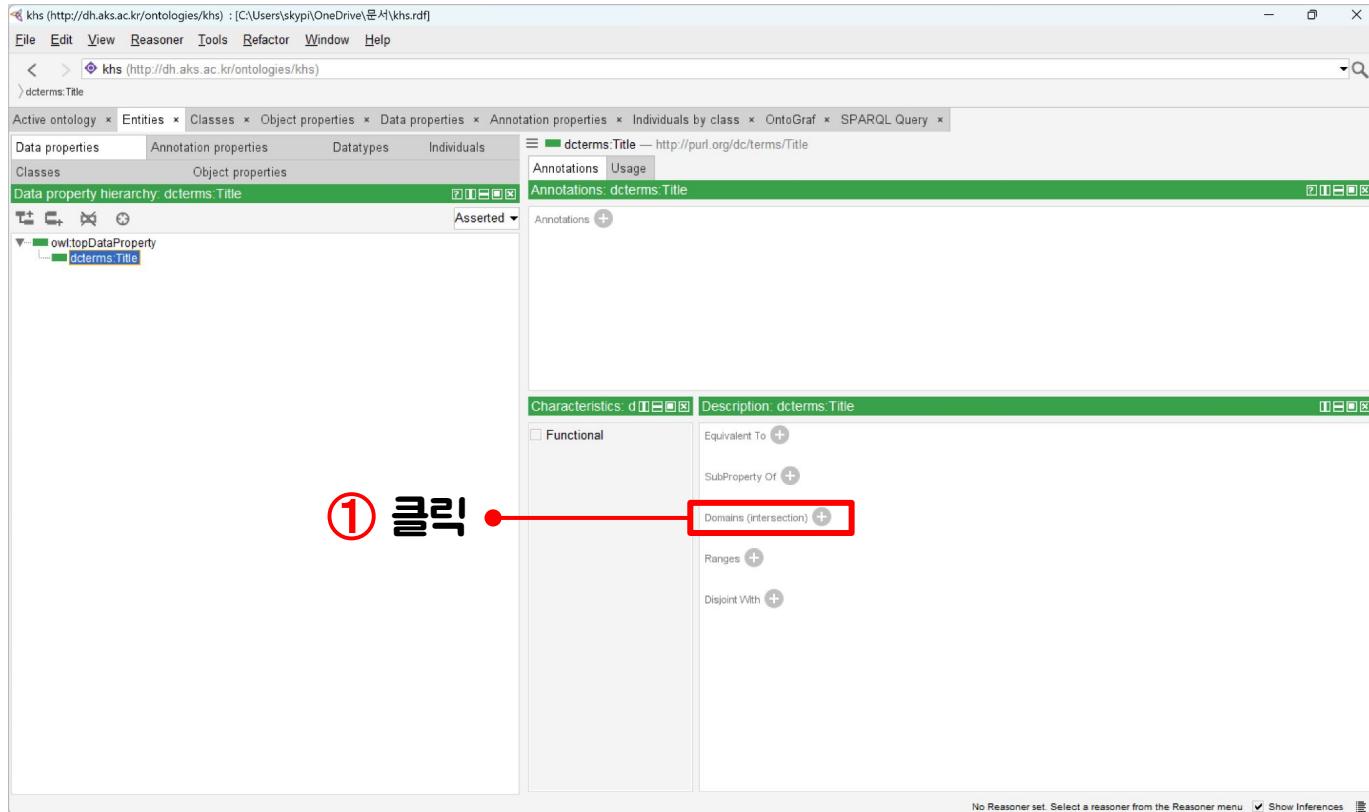
Data properties : 데이터 속성값 입력



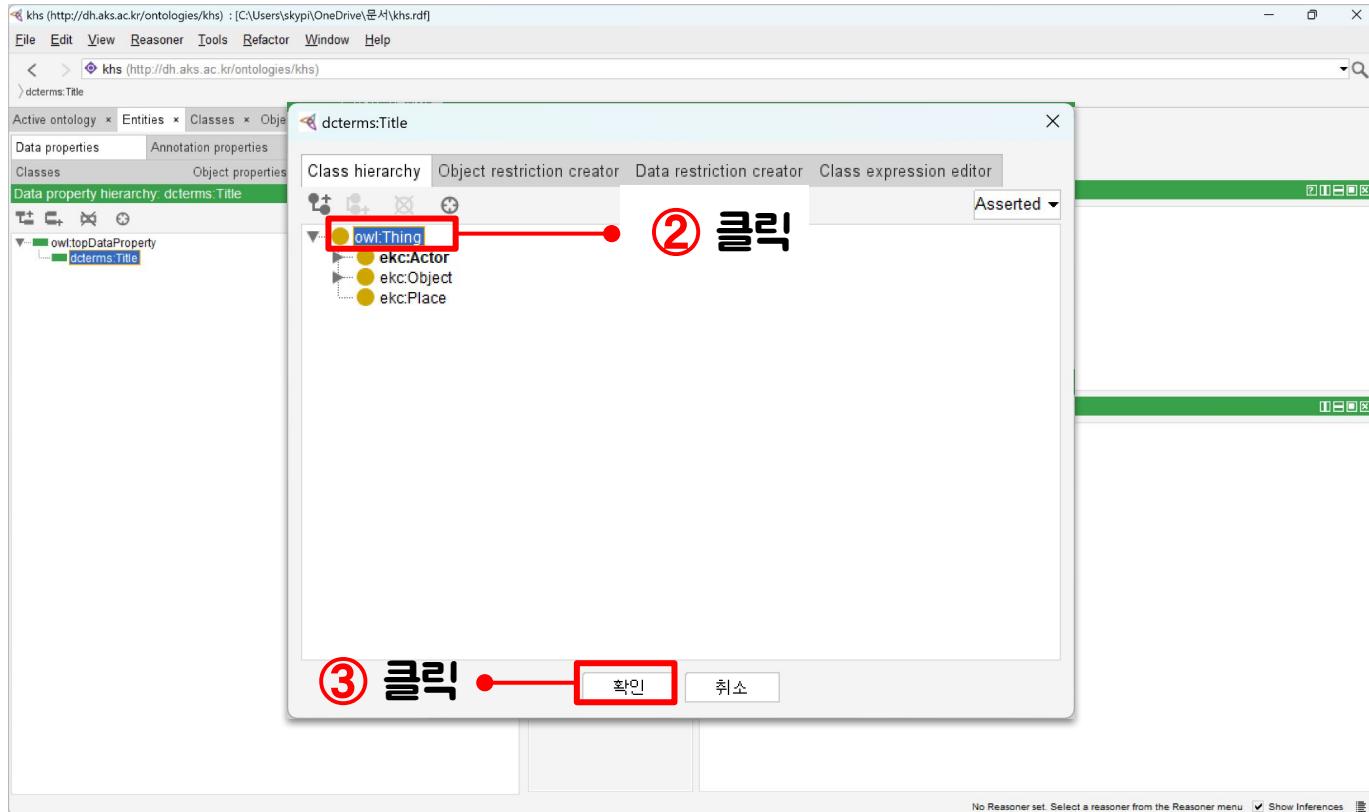
Data properties : 데이터 속성값 입력



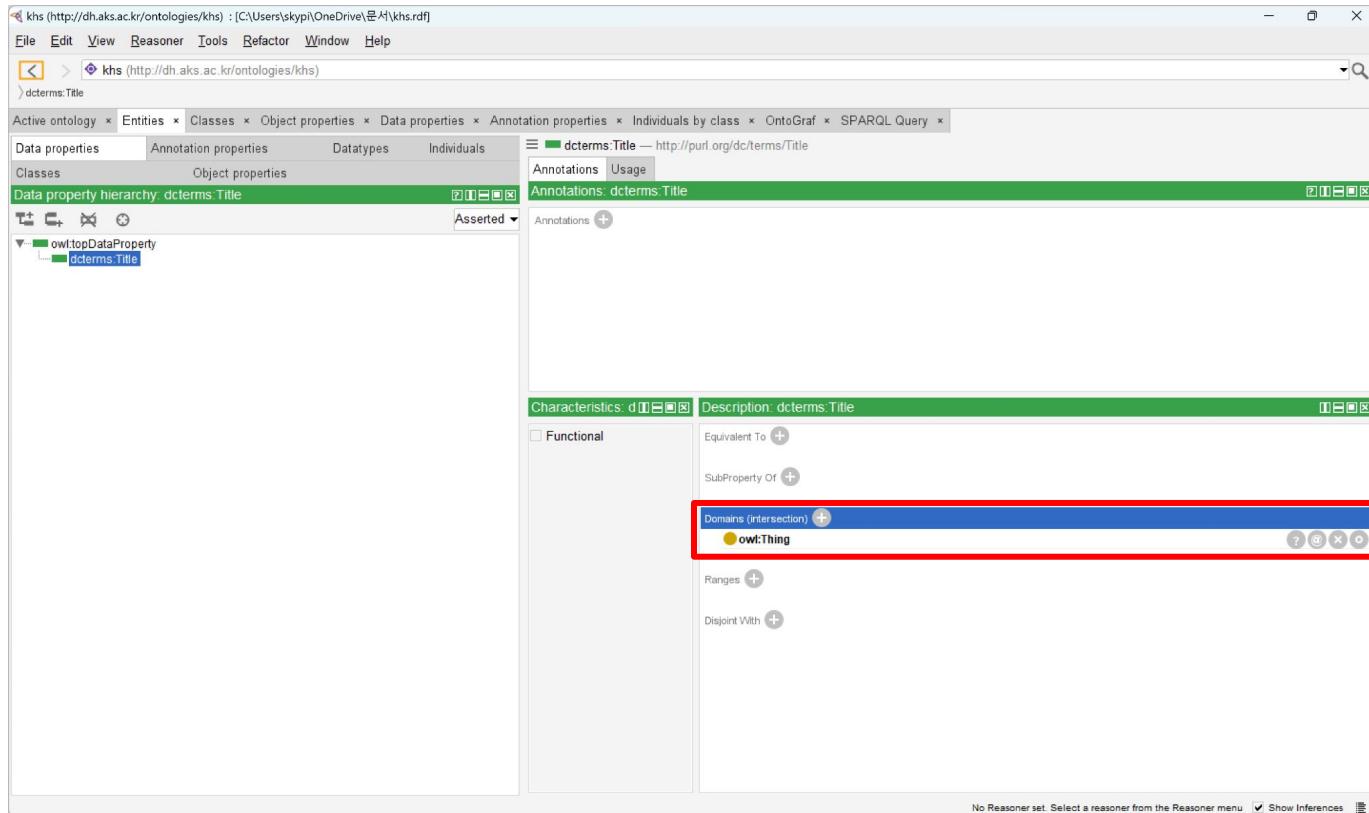
Data properties : 데이터 속성값 입력



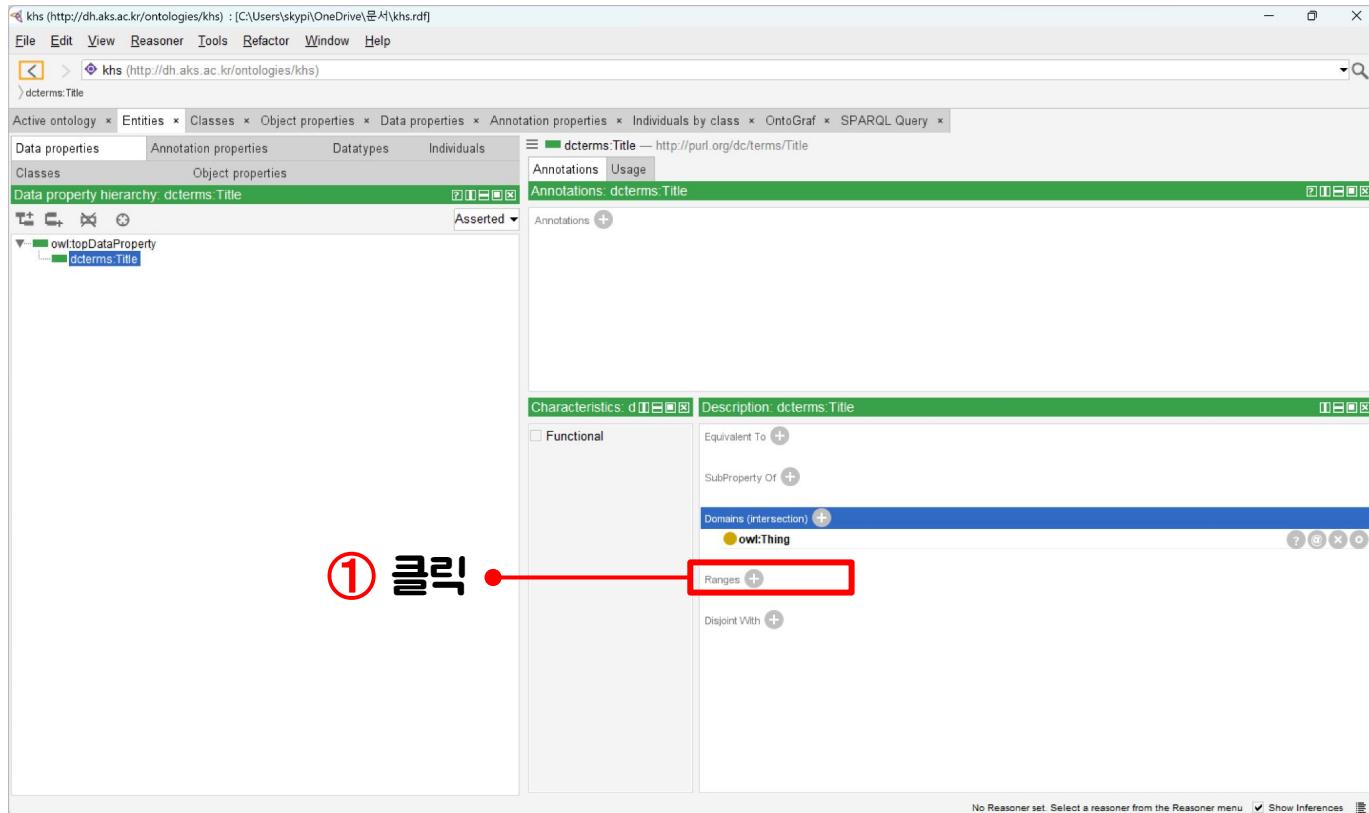
Data properties : 데이터 속성값 입력



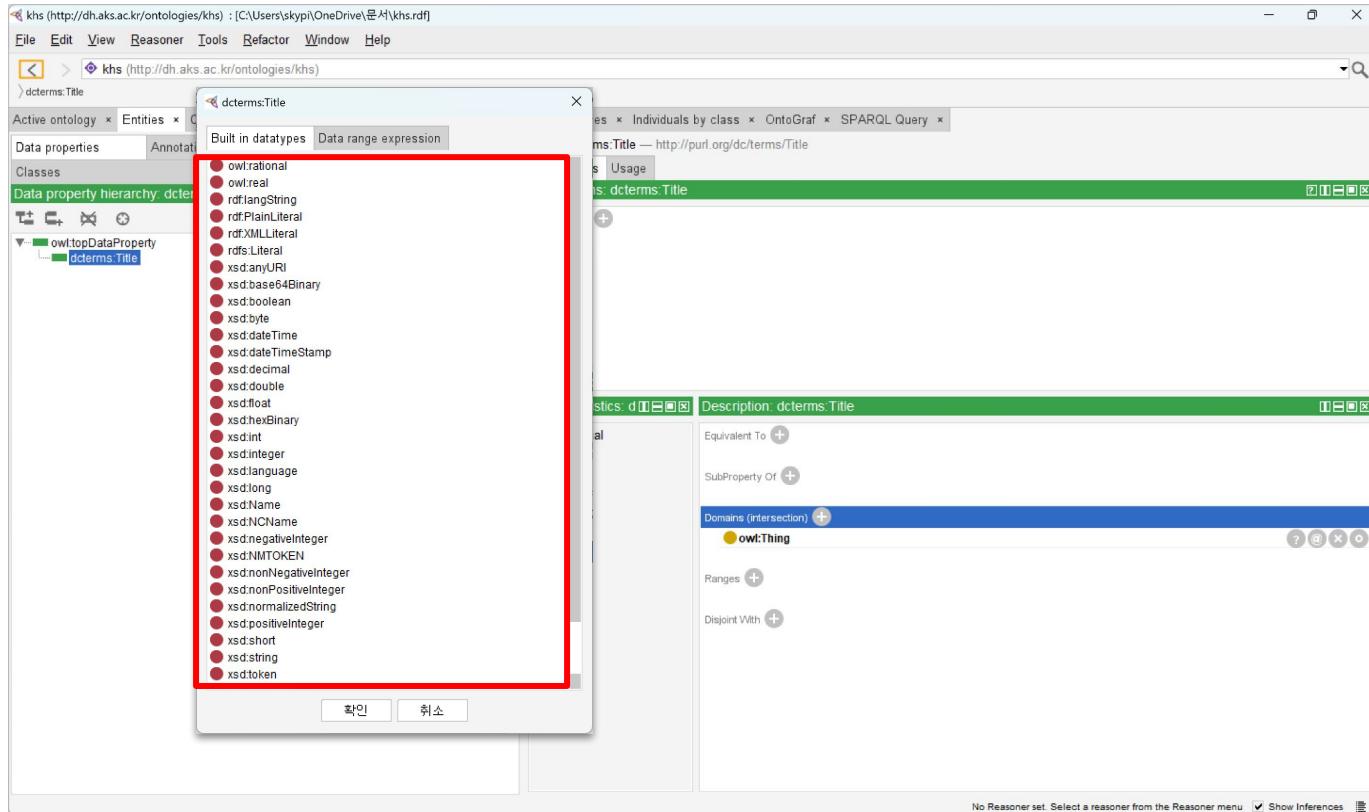
Data properties : 데이터 속성값 입력



Data properties : 데이터 속성값 입력



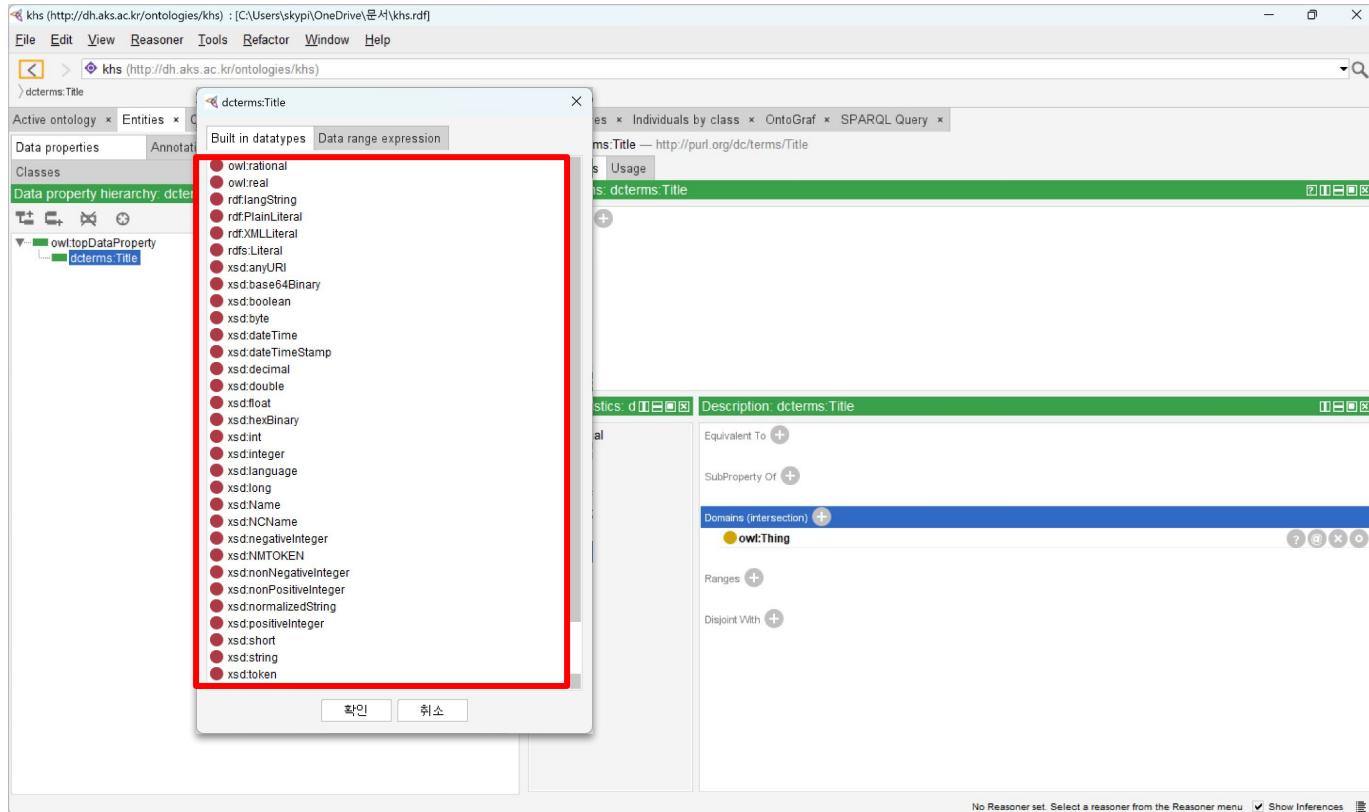
Data properties : 데이터 속성값 입력



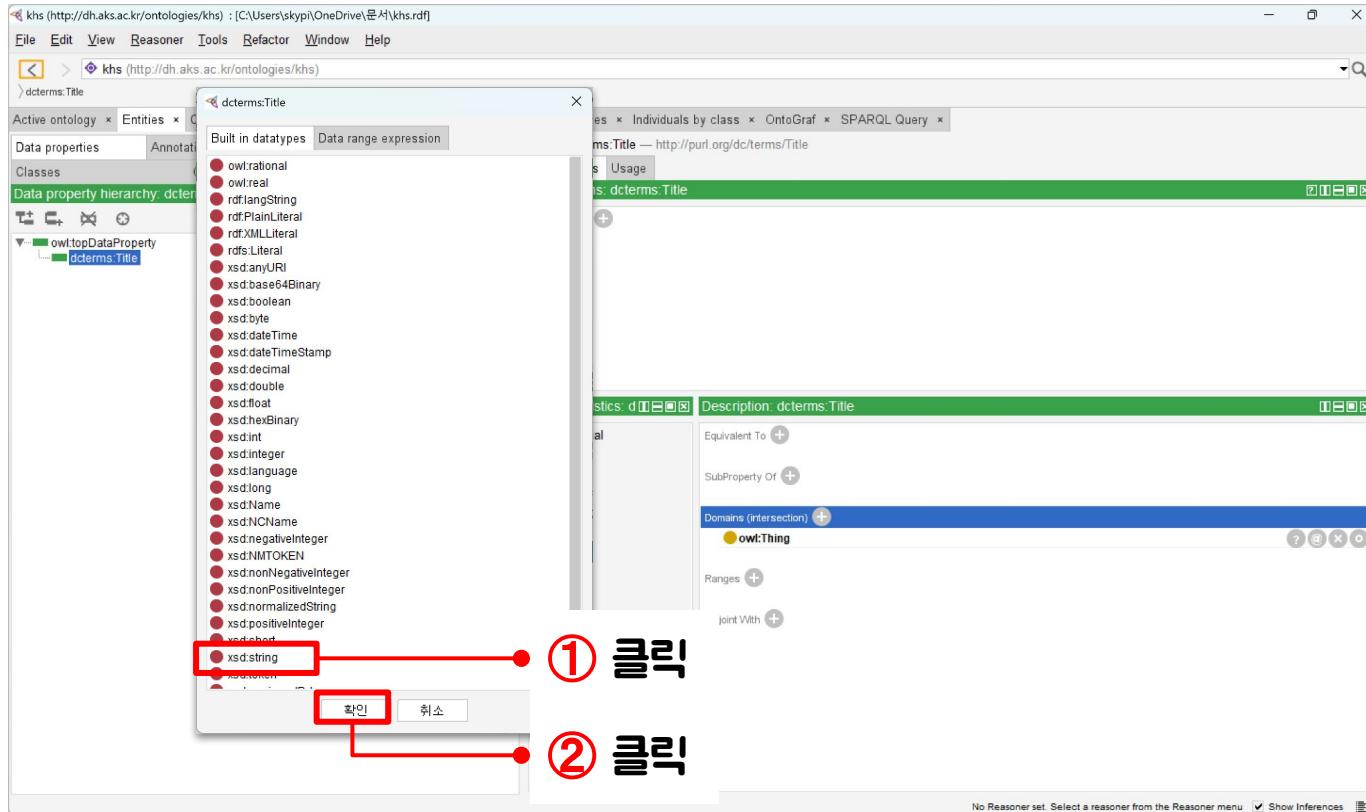
※ Data Types

데이터 유형	설명
rdfs:Literal	문자
xsd:float	실수
xsd:dateTime	날짜
xsd:int / xsd:integer	숫자
xsd:string	문자
xsd:anyURI	다른 곳의 고유한 id 값을 사용 할 때 연결시키기 위해 사용

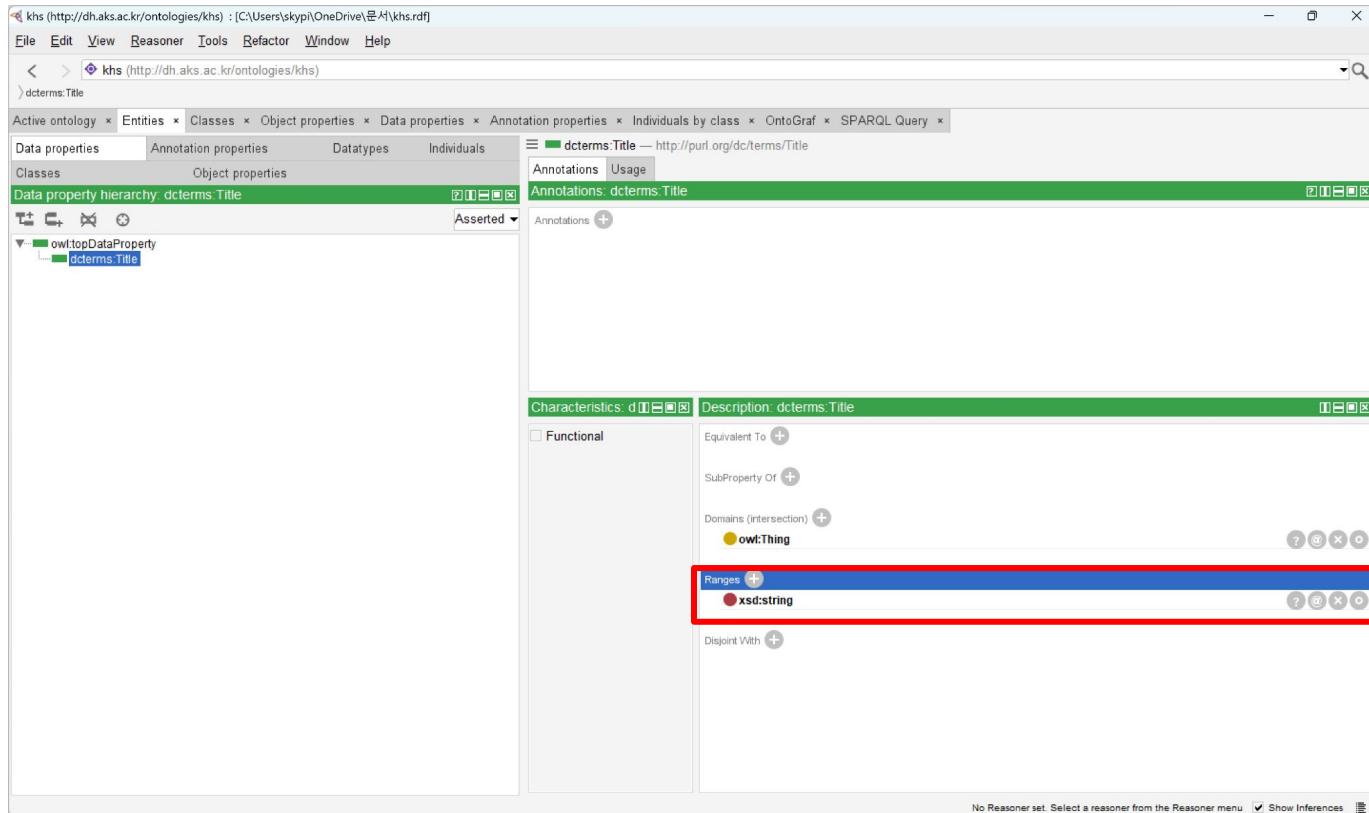
Data properties : 데이터 속성값 입력



Data properties : 데이터 속성값 입력



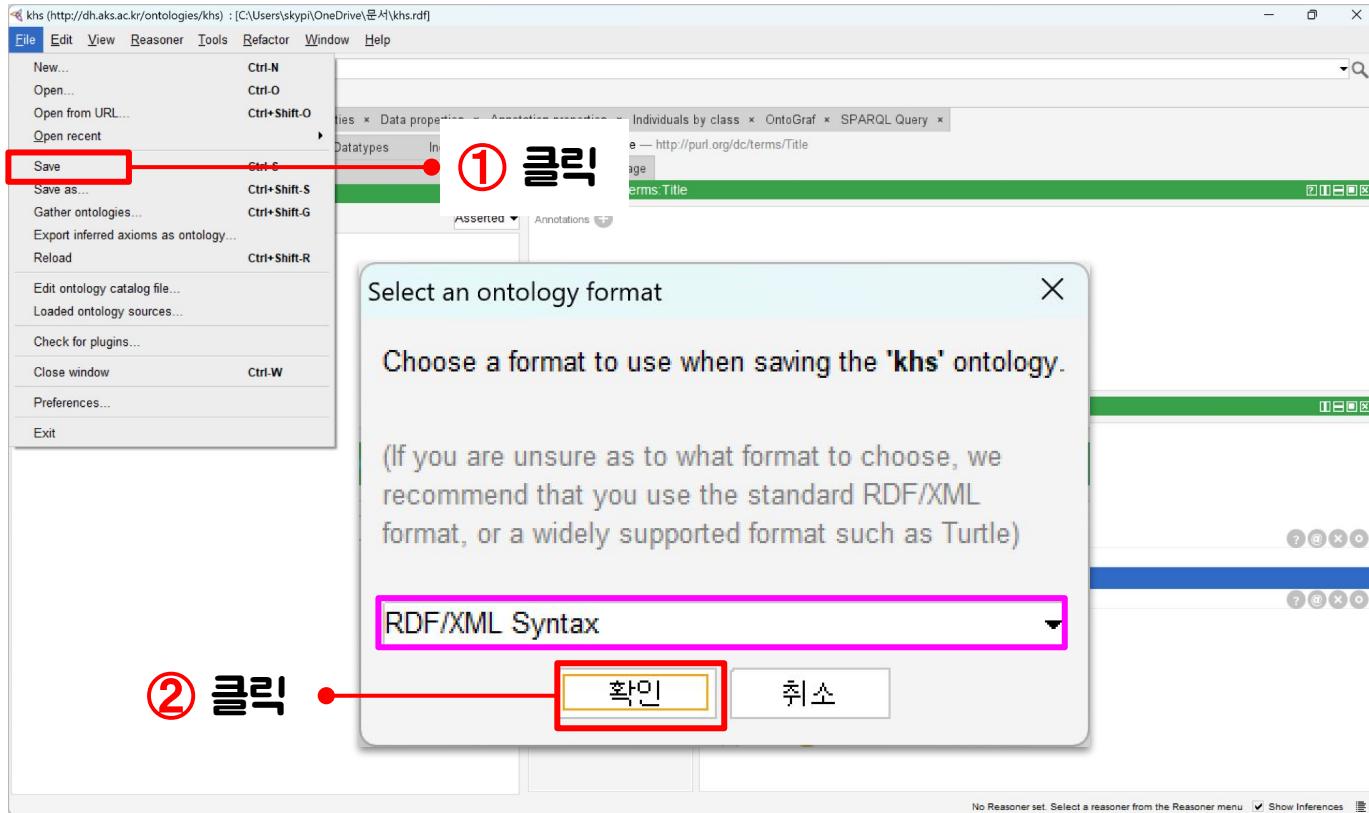
Data properties : 데이터 속성값 입력



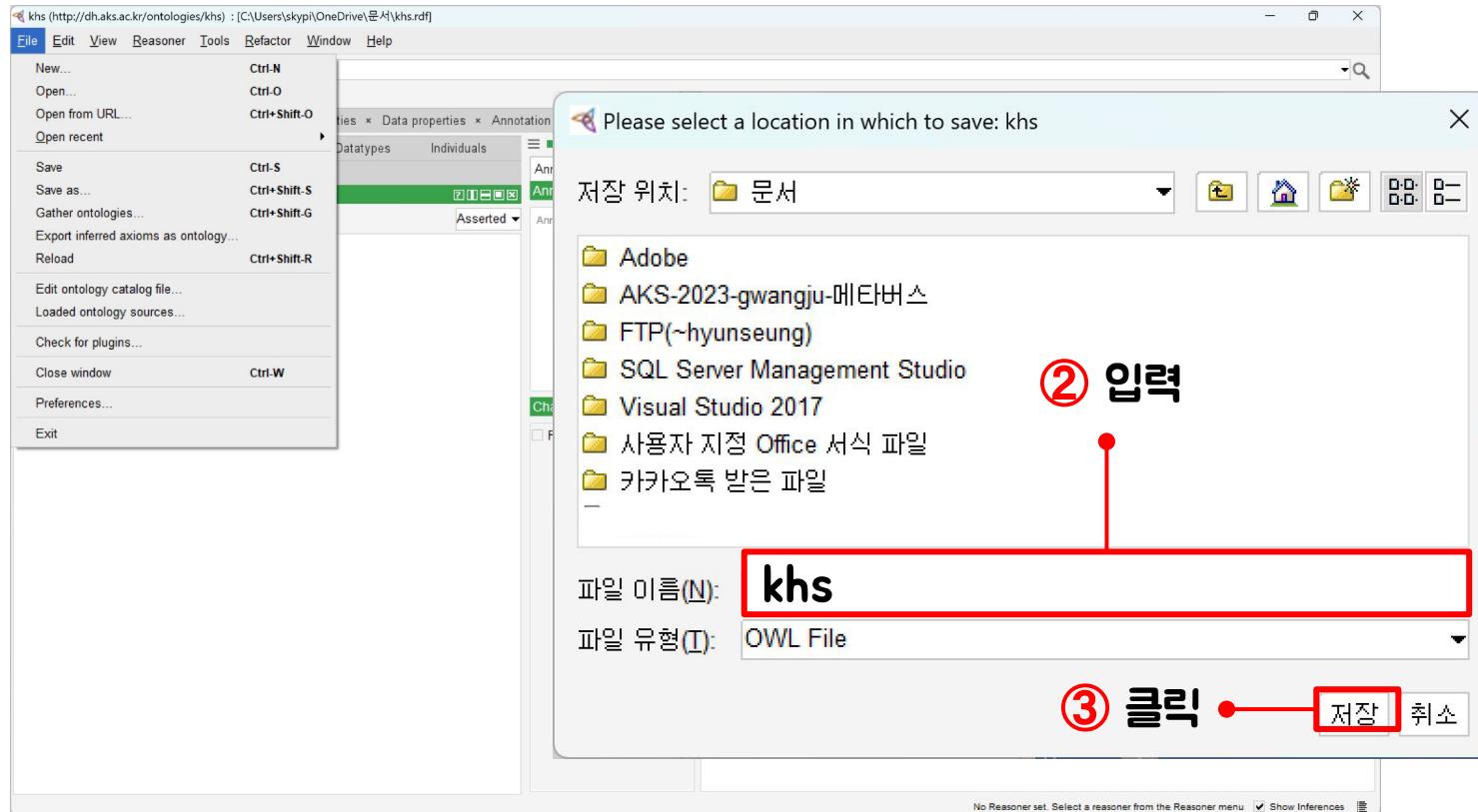
7

프로테제 실습 - 마무리

마무리 : 파일 저장



마무리 : 파일 저장

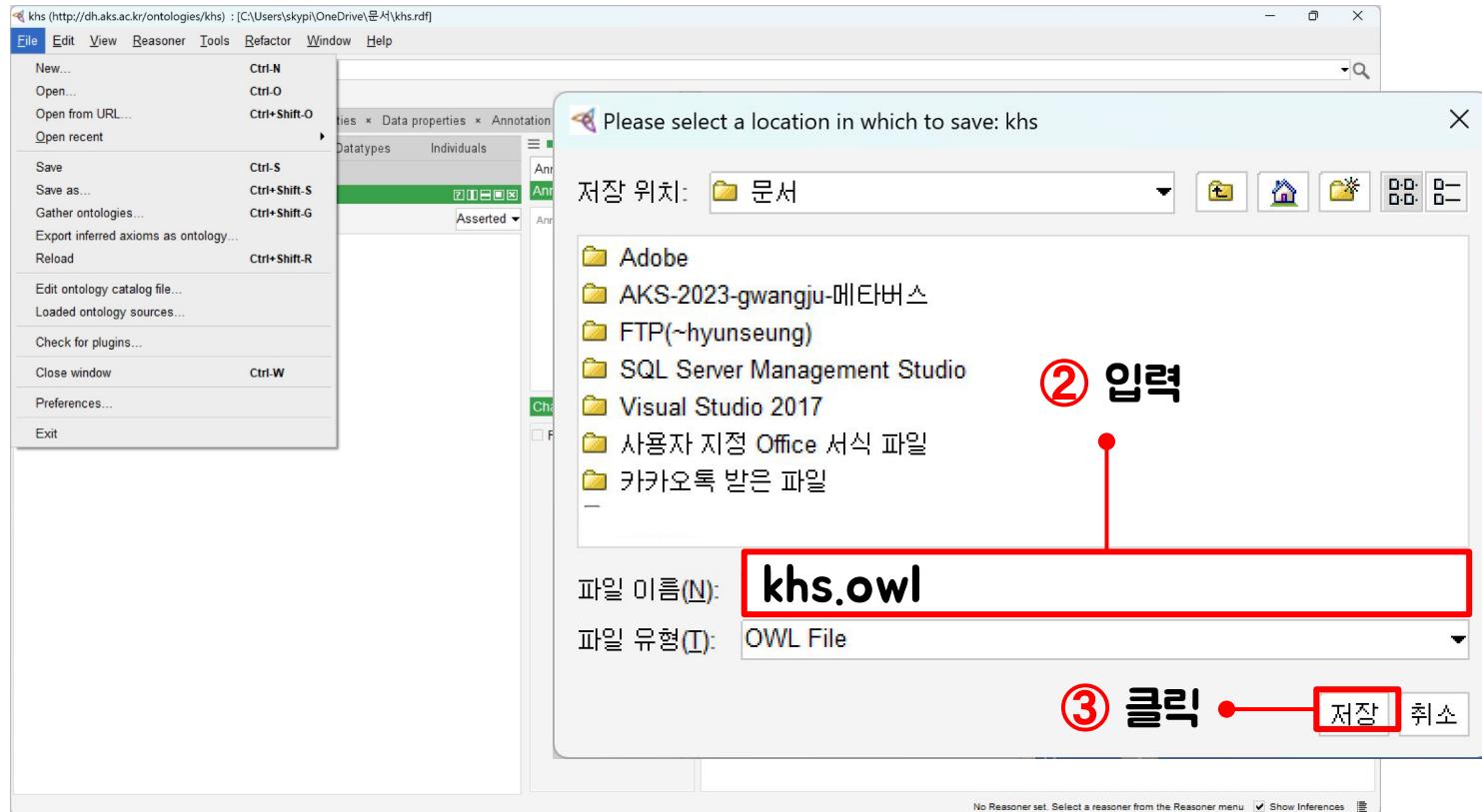


마무리 : 파일 저장

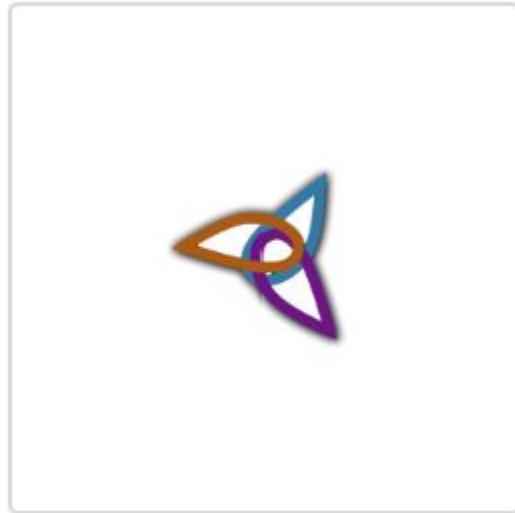


✓ khs.rdf

마무리 : 파일 저장

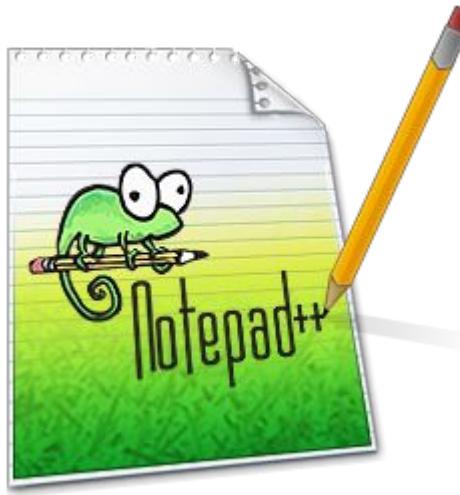


마무리 : 파일 저장



✓ khs.owl

※ 프로그램 다운로드



❖ 노트패드++(Notepad++)

: 문서 편집기이자 소스 코드 편집기



❖ 파일질라(FileZilla)

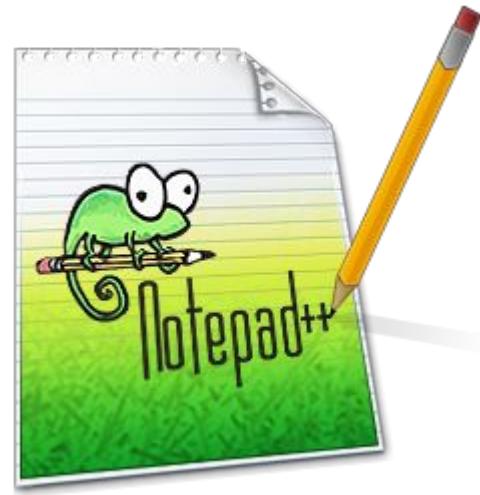
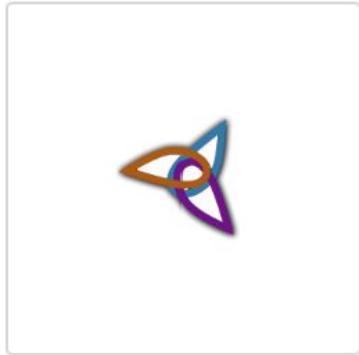
: 서버 및 클라이언트 양자 사이의 FTP 프로토콜에 의한 파일 전송을 지원하는 소프트웨어

※ 프로그램 다운로드

실습 도구 [편집]

- [Protege v5.6.4 for Windows 다운로드](#)
- [Notepad++ v8.7 for Windows 다운로드](#)
- [FileZilla Client v3.67 for Windows 다운로드](#)
- [FileZilla 사용법](#)

마무리 : 메모장으로 파일 열어보기



마무리 : 메모장으로 파일 열어보기

```
1 <?xml version="1.0"?>
2 <rdf:RDF xmlns="http://www.semanticweb.org/skypi/ontologies/2024/9/untitled-ontology-9/"
3     xml:base="http://www.semanticweb.org/skypi/ontologies/2024/9/untitled-ontology-9/"
4     xmlns:ekc="http://dh.aks.ac.kr/ontologies/encyclopedicarchivesofkoreanculture#"
5     xmlns:khs="http://dh.aks.ac.kr/ontologies/khs#"
6     xmlns:owl="http://www.w3.org/2002/07/owl#"
7     xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
8     xmlns:xml="http://www.w3.org/XML/1998/namespace"
9     xmlns:xsd="http://www.w3.org/2001/XMLSchema#"
10    xmlns:rdfs="http://www.w3.org/2000/01/rdf-schema#"
11    xmlns:dcterms="http://purl.org/dc/terms#">
12    <owl:Ontology rdf:about="http://dh.aks.ac.kr/ontologies/khs">
13        <rdfs:comment xml:lang="ko">김현승이 2024년에 만든 디지털유산프로젝트 수업 실습 온톨로지이다.
14    </rdfs:comment>
15 </owl:Ontology>
```

마무리 : 메모장으로 파일 열어보기

```
17
18      <!--
19      ///////////////////////////////////////////////////////////////////
20      //
21      // Object Properties
22      //
23      ///////////////////////////////////////////////////////////////////
24      -->
25
26
27
28
29      <!-- http://dh.aks.ac.kr/ontologies/encyclopedicarchivesofkoreanculture#isCreatorOf -->
30
31      <owl:ObjectProperty rdf:about=
32      "http://dh.aks.ac.kr/ontologies/encyclopedicarchivesofkoreanculture#isCreatorOf">
33          <owl:inverseOf rdf:resource="http://purl.org/dc/terms/creator" />
34          <rdfs:domain rdf:resource=
35          "http://dh.aks.ac.kr/ontologies/encyclopedicarchivesofkoreanculture#Actor" />
36          <rdfs:range rdf:resource=
37          "http://dh.aks.ac.kr/ontologies/encyclopedicarchivesofkoreanculture#Object" />
38      </owl:ObjectProperty>
```

마무리 : 메모장으로 파일 열어보기

```
59 <!--
60 ///////////////////////////////////////////////////
61 //
62 // Data properties
63 //
64 ///////////////////////////////////////////////////
65 -->
66
67
68
69
70 <!-- http://purl.org/dc/terms/Title -->
71
72 <owl:DatatypeProperty rdf:about="http://purl.org/dc/terms/Title">
73   <rdfs:domain rdf:resource="http://www.w3.org/2002/07/owl#Thing"/>
74   <rdfs:range rdf:resource="http://www.w3.org/2001/XMLSchema#string"/>
75 </owl:DatatypeProperty>
76
```

마무리 : 메모장으로 파일 열어보기

```
79 <!--
80 ///////////////////////////////////////////////////////////////////
81 //
82 // Classes
83 //
84 ///////////////////////////////////////////////////////////////////
85 -->
86
87
88
89
90 <!-- http://dh.aks.ac.kr/ontologies/encyclopedicarchivesofkoreanculture#Actor -->
91
92 <owl:Class rdf:about=
93 "http://dh.aks.ac.kr/ontologies/encyclopedicarchivesofkoreanculture#Actor">
94 |   <rdfs:comment xml:lang="ko">행위자</rdfs:comment>
95 </owl:Class>
96
97
98 <!-- http://dh.aks.ac.kr/ontologies/encyclopedicarchivesofkoreanculture#Group -->
99
100 <owl:Class rdf:about=
101 "http://dh.aks.ac.kr/ontologies/encyclopedicarchivesofkoreanculture#Group">
102 |   <rdfs:subClassOf rdf:resource=
103 |     "http://dh.aks.ac.kr/ontologies/encyclopedicarchivesofkoreanculture#Actor"/>
104 </owl:Class>
```

마무리 : 메모장으로 파일 열어보기

134
135
136
137

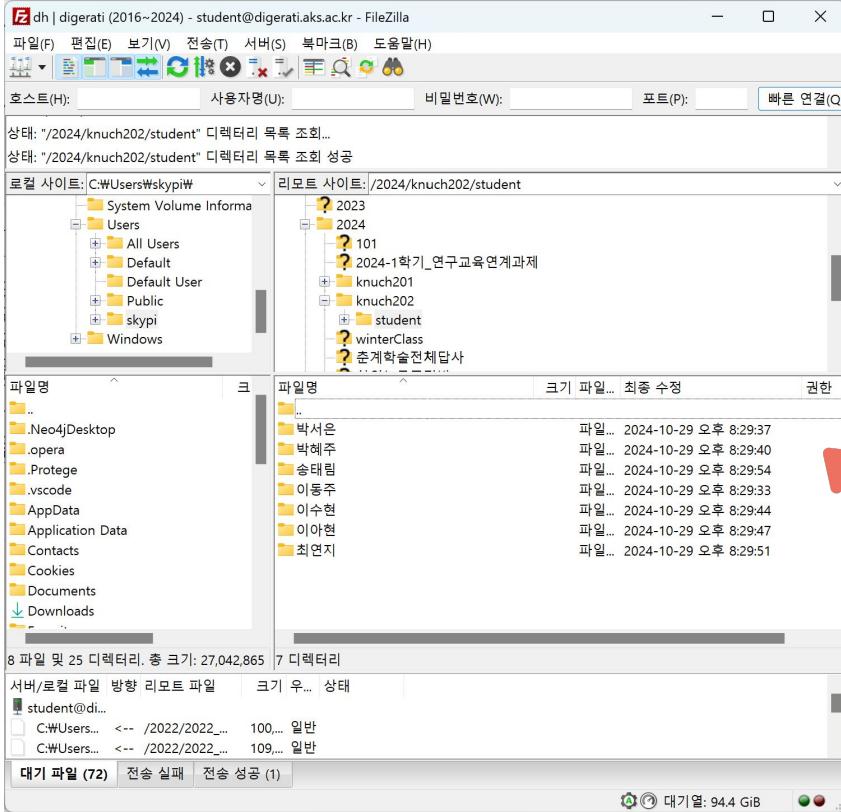
```
<!-- Generated by the OWL API (version 4.5.29.2024-05-13T12:11:03Z)  
https://github.com/owlcs/owlapi -->
```



<!-- Generated by koreandressdhedu@gmail.com / 2024.10.30. -->

본인 연락처와 파일 작성 날짜로 수정

마무리 : 파일 업로드

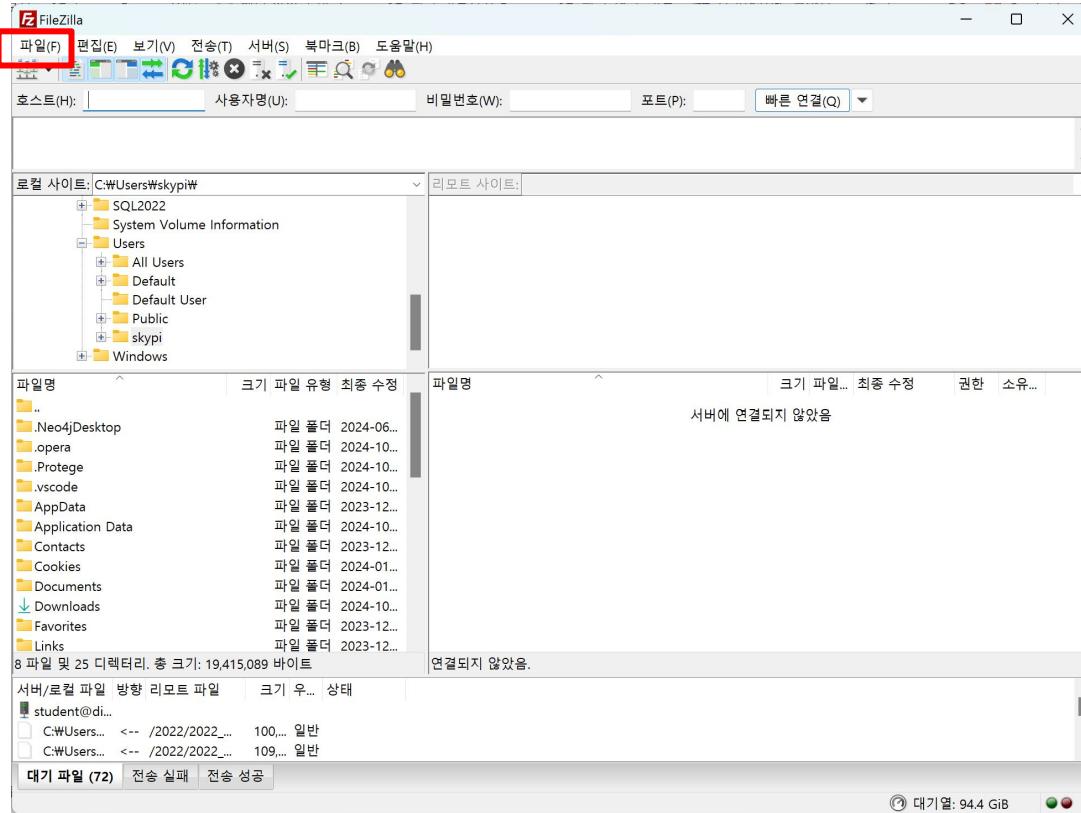


/2024/knuch202/student

각자 본인 폴더에
.owl 또는 .rdf
파일 업로드 완료하기

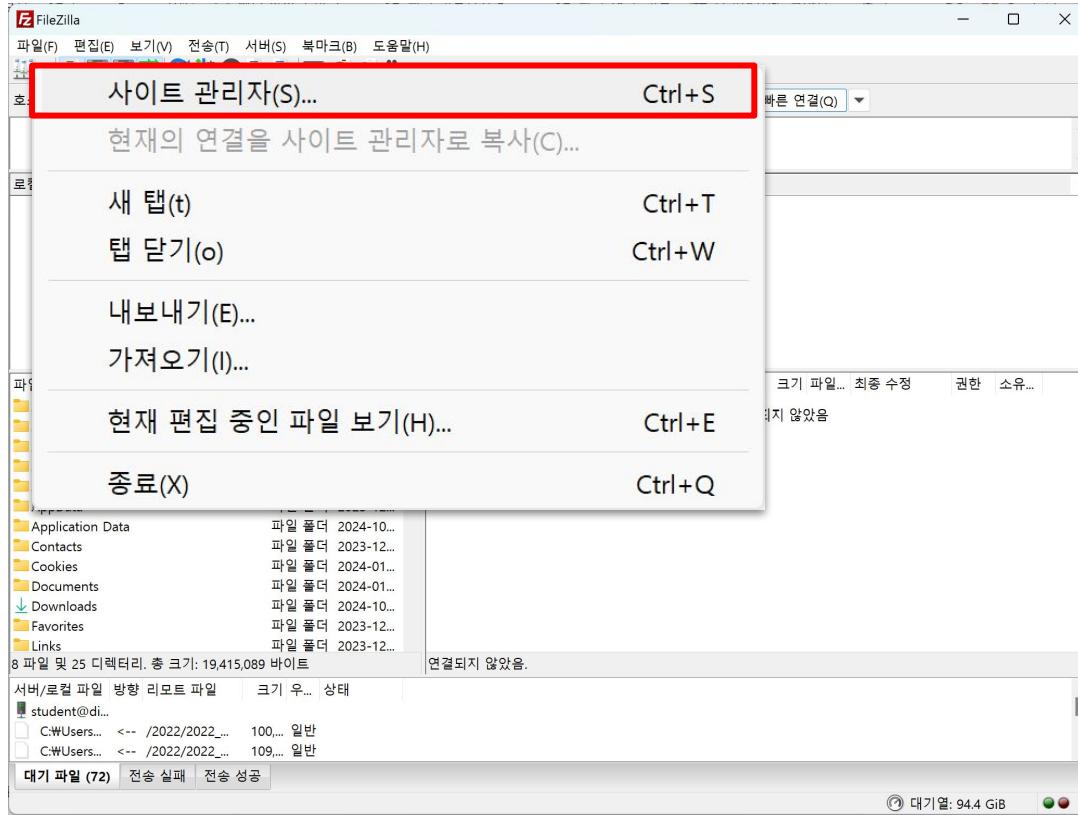
※ FileZilla

파일 메뉴 클릭!



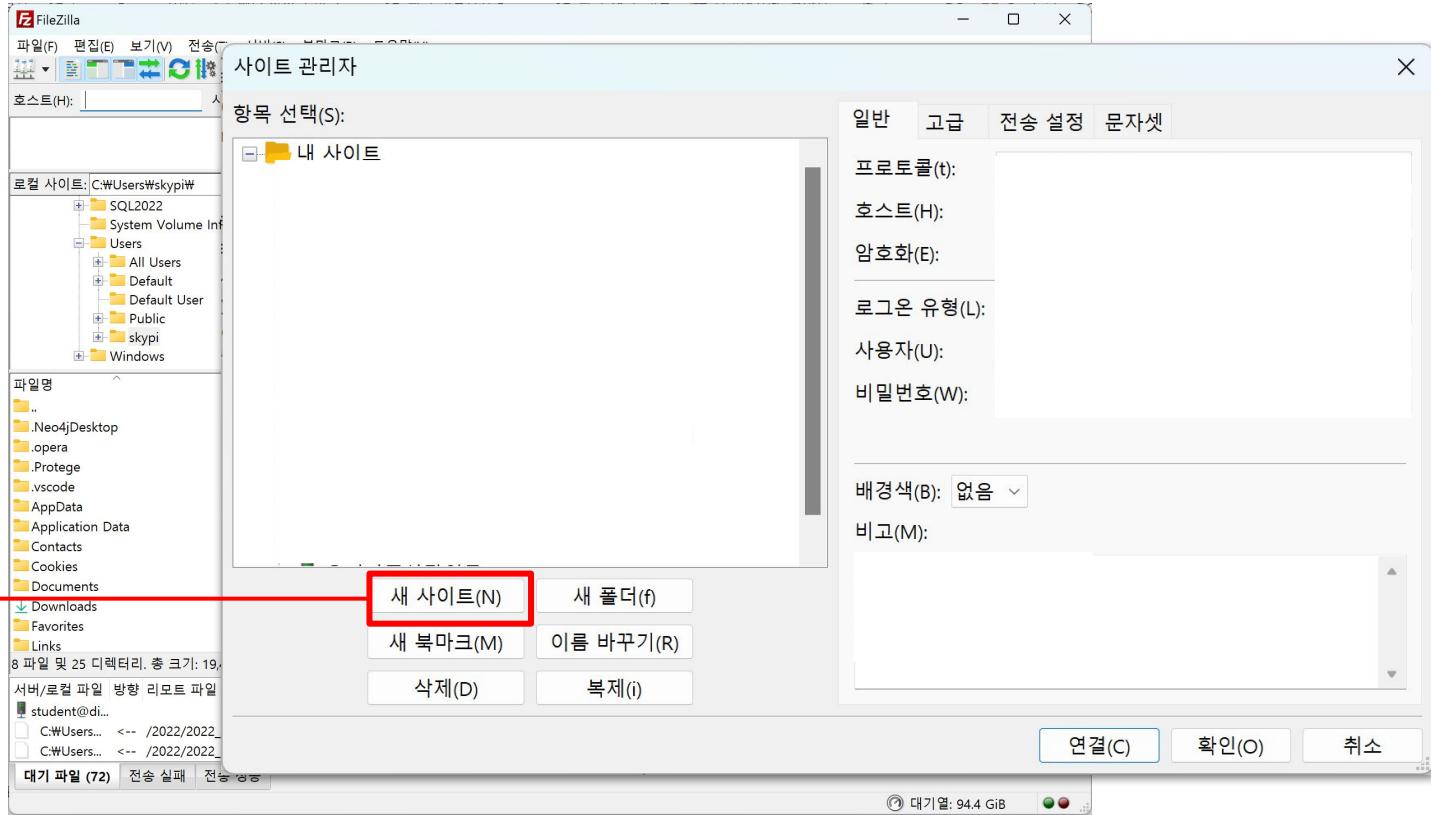
※ FileZilla

사이트 관리자 클릭



※ FileZilla

새 사이트 클릭



※ FileZilla

① 새 사이트 이름
자유롭게 기재



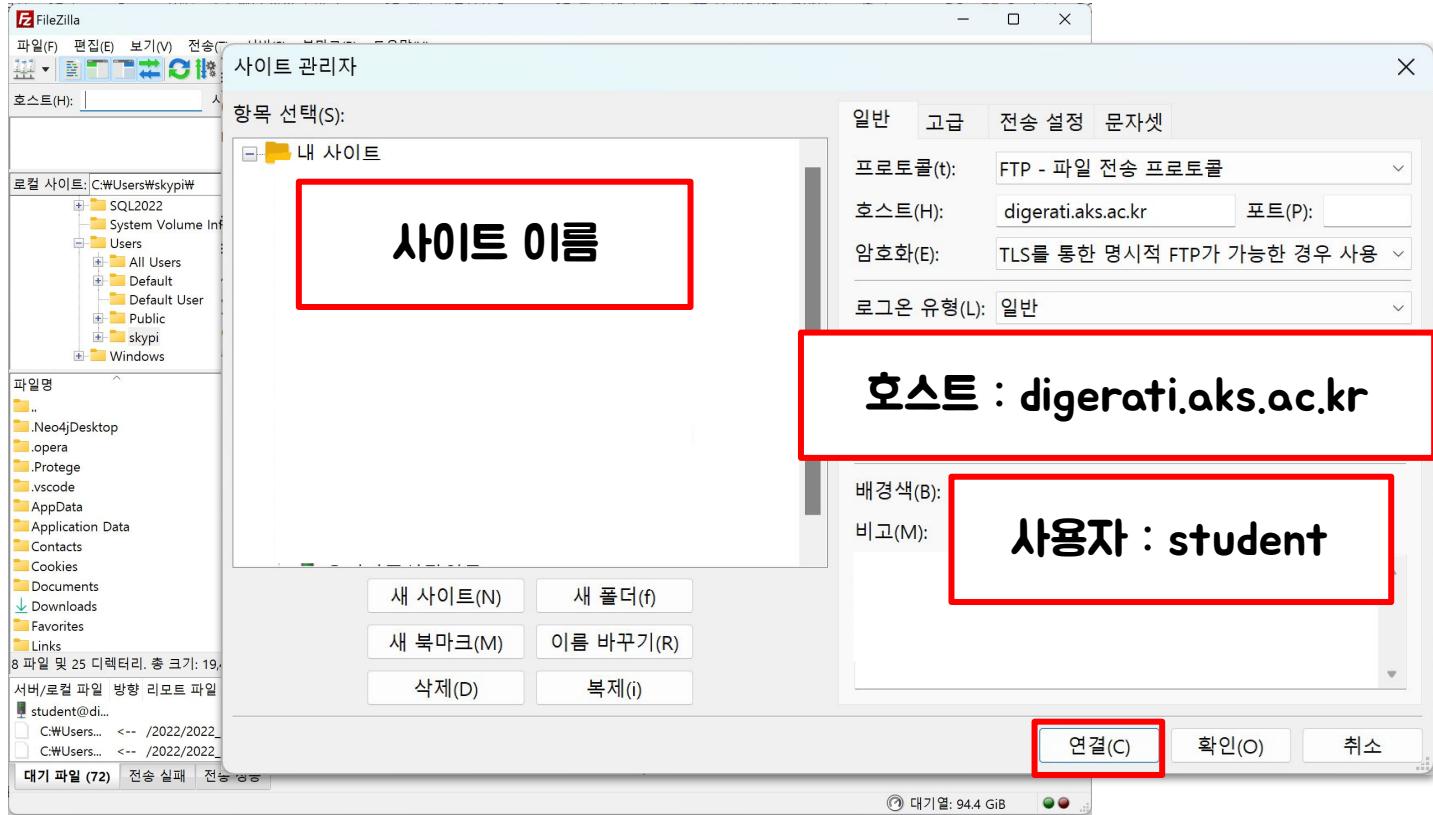
② 호스트 작성



③ 사용자 /
비밀번호 입력

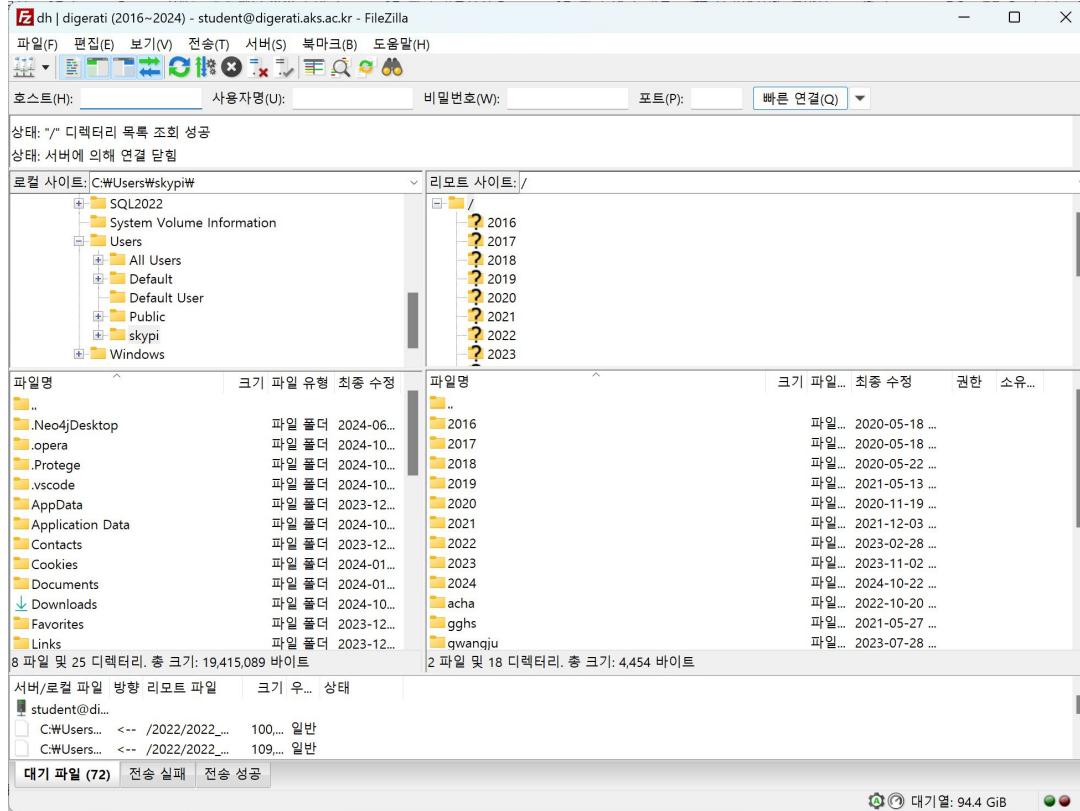


④ 연결 클릭

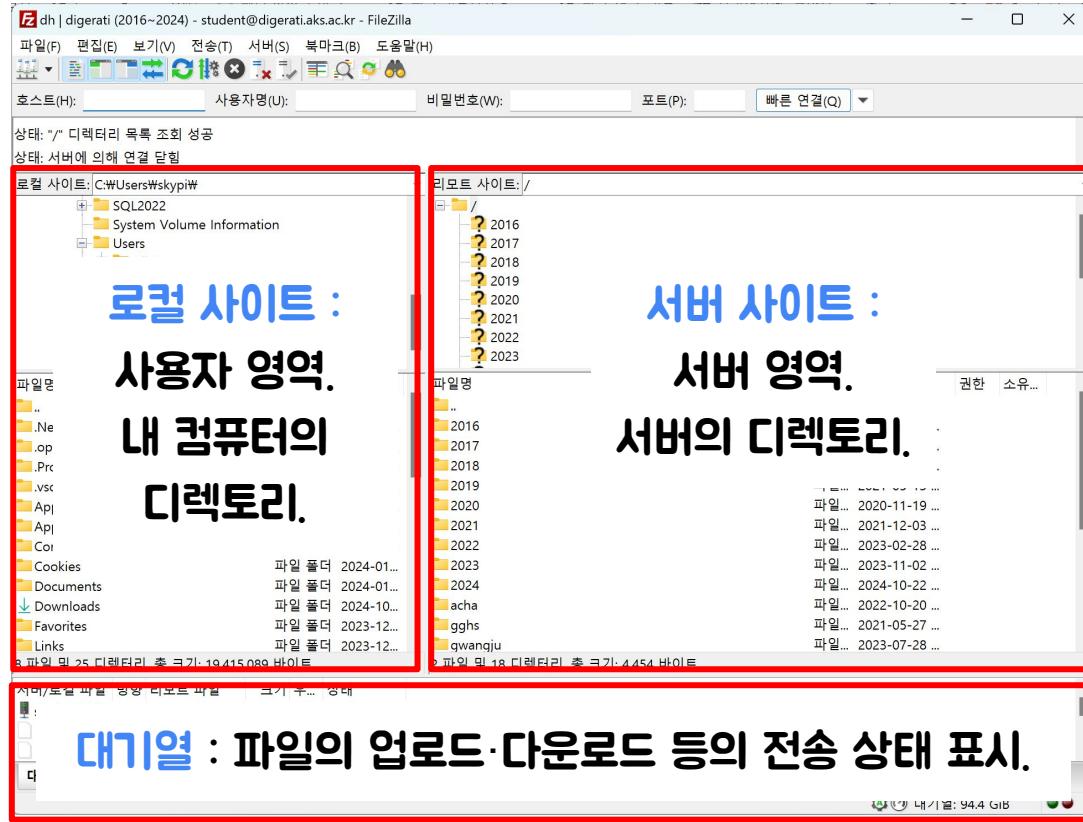


※ FileZilla

연결 완료



※ FileZilla





파일질라 사용법

<https://dh.aks.ac.kr/Edu/wiki/index.php/튜토리얼/ftp>